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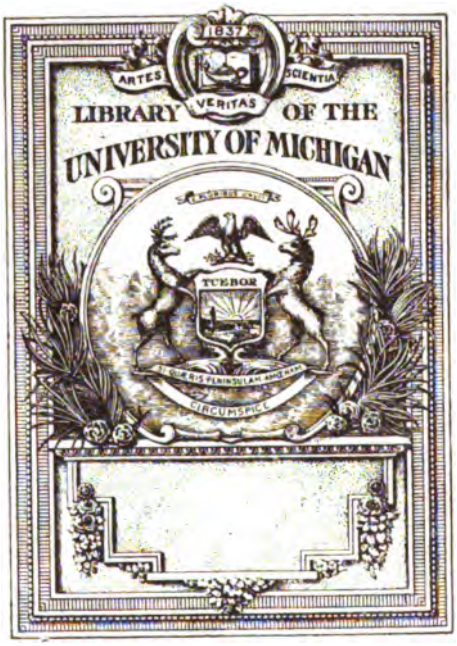

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VOL. VII.

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Ethiops antimonial, martial, and mineral. See Pharmacy-*Index*.

Ethiops || Etmuller

ETHMOIDES, in anatomy, a bone ſituated in the middle of the baſis of the forehead or os frontis, and at the top of the root of the noſe, filling almoſt the whole cavity of the noſtrils. It has its name from ἠθμος *cribrum*, "ſieve," and εἶδος "form," becauſe all ſpongy and porous. See Anatomy, n° 17.

ETHNARCHA. Ethnarch, (formed of ἔθνος *nation*, and ἀρχὴ *command*), a governor or ruler of a nation.

There are ſome medals of Herod I. ſurnamed the *Great*, on one ſide whereof is found Ἡρῴδου, and on the other Ἐθναρχου, q. d. *Herod the Ethnarch*. After the battle of Philippi, we read that Antony, paſſing over into Syria, conſtituted Herod and Phaſael his brother tetrarchs, and in that quality committed to them the adminiſtration of the affairs of Judea. (Joſ. Ant. lib. xiv. cap. 23.) Herod therefore had the government of the province before ever the Parthians entered Syria, or before Antigonus's invaſion, which did not happen till ſix or ſeven years after Herod was commander in Galilee. (Joſ. lib. xiv. cap. 24, 25.) Conſequently Herod was then truly ethnarch, for he can be no otherwiſe denominated; ſo that it muſt have been in that ſpace of time that the medals were ſtruck, which only give him this title: which medals are a confirmation of what we read in hiſtory of the government which that prince was intruſted with before he was raiſed to the royalty.

Joſephus gives Herod the appellation of *tetrarch* in lieu of that of *ethnarch*; but the two terms come ſo near to each other, that it is eaſy to confound them together.

Though Herod the Great left by will to Archelaus all Judea, Samaria, and Idumea, yet Joſephus tells us he was then only called *ethnarch*.

ETHNOPHRONES, in antiquity, a ſect of heretics in the ſeventh century, who made a profeſſion of Chriſtianity, but joined thereto all the ceremonies and follies of paganiſm, as judicial aſtrology, ſortileges, auguries, and other divinations.

ETIQUETTE, a French term, primarily denoting a ticket or title affixed to a bag or bundle of papers, expreſſing its contents. It is alſo uſed, when applied to the Spaniſh and ſome other courts, to ſignify a particular account of what is to be done daily in the king's houſehold, and in the chief ceremonies relating to it. It likewiſe denotes thoſe forms that regulate the decorum of conduct towards perſons of various ranks and ſtations.

ETMULLER (Michael), a moſt eminent phyſician, born at Leipſic in 1646. After having travelled through the greateſt part of Europe, he became profeſſor of botany, chemiſtry, and anatomy, at Leipſic; where he died in 1683. He was a very voluminous writer; his works making no leſs than 5 vols folio, as printed at Naples in 1728. His ſon Michael Erneſt Etmuller was alſo an ingenious phyſician, who publiſhed ſeveral pieces, and died in 1732.

Etna.

ETNA, or Ætna, a famous burning mountain of Sicily, and the largeſt in Europe; of which an account has been already given under the latter ſpelling Ætna. The following additional particulars relating to the eruptions, ſize, ſcenery, and products, of this celebrated volcano, are collected from the *Voyage Pittoreſque* of M. Houel, who appears to have ſurveyed it with greater accuracy than any former traveller.

Houel's obſervations.

The form of mount Etna is that of a cone, very broad at the baſe, which is more than 40 miles in circumference. From the bottom you aſcend ten leagues before reaching its ſummit on the ſouth ſide; and on any of the other ſides, the way being not ſo ſtraight, would be conſiderably longer. Etna is entirely compoſed of ſubſtances that have been diſcharged from the volcano in its various exploſions.

It appears from the quantities of marine bodies depoſited all over the under part of Etna, that it muſt have been once covered by the ſea to at leaſt one half of its preſent height. The whole iſland of Sicily, and the greateſt part of mount Etna, have been, in our author's opinion, formed under water. But the period when the eruptions from this volcano firſt commenced, the manner in which the ſea ſubſided, and the preciſe time at which it fell ſo low as its preſent level on the ſhores of Sicily, are facts concerning of which we have no certain knowledge.

The general principle, however, M. Houel thinks may be regarded as undeniable. When this mountain ſtood half under water, the currents of the ocean would gradually accumulate upon it large maſſes, both of its own productions, ſuch as ſhells, and bones of fiſhes, and of various other matters, which would be intermixed with the volcanic matters diſcharged from the focus of the burning mount. In a long ſeries of ages theſe ſtrata of heterogeneous matters would naturally become ſo conſiderable as to form the enormous maſs of mountains with which the volcano is now ſurrounded. The currents of the ocean might often convey the volcanic matters to a conſiderable diſtance from the volcanic focus. And there are mountains at no ſmall diſtance from Etna, which ſeem to have been produced in this manner. Thoſe of Carlintini, at the diſtance of 15 leagues, conſiſt chiefly

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Etna.

of a mixture of pozzolana with calcareous matters. At Lintini, and in places around it, there are diſtinct beds of pozzolana, ſcoriæ, and real lava, as well as others in which all theſe matters are blended together in a maſs of calcareous matter. At Palazzolo, about 24 miles from the city of Syracuſe, the ſides of the hills having been cut by the ſtreams which run down them, in many places to a conſiderable depth, diſplay huge maſſes of lava, and extenſive beds of pozzolana. In the neighbourhood of Noto there are alſo volcanic productions to be found.

At Pachino, where the iſland of Sicily forms an angle, there are a range of hills extending for ſeveral miles, which conſiſt all of pozzolana.

The province of Val de Noto is more homogeneous in the matters of which its ſoil conſiſts, than the two other dales of Sicily. Theſe, in every hill which they contain, exhibit a vaſt variety of different matters. So amazing, indeed, is that variety, that they may be conſidered as exhibiting a collection of ſpecimens of all the different materials which enter into the compoſition of the globe. In theſe two dales few volcanic productions have been yet obſerved. But it is not to be inferred for this reaſon, that they contain but few. They may be hereafter diſcovered in great plenty. In the volcano of water at Maccalubbe, between Aragona and Girginti; in the baths of Caſtellamare, near Alcamo and Segeſte; in the baths of Termini, in the iſles of Lipari; in the hot waters of Ali, between Meſſina and Taormina, by the lake in the valley of Caltagirone; in all theſe places, which comprehend the whole circumference of Sicily, the influence of the volcano of Etna is, in ſome meaſure, felt. Nay, it would even ſeem, that in theſe places there are ſo many volcanic craters. All of theſe are ſo diſpoſed as to ſhow that they exiſted prior not only to the volcanic matters, but to the other ſubſtances intermixed with them.

The waters of the ſea have, in former times, riſen much higher than at preſent. But how they retreated, or whether they are to continue ſtationary at their preſent height, we know not. For more than 2000 years, during which Sicily has been inhabited, and has had cities and harbours, the ſea has not been obſerved either to recede or encroach in any conſiderable degree.

When the ſea ſubſided from mount Etna, the mountain muſt have been covered over with ſuch matters as the ſea uſually depoſits; conſequently with calcareous matters. A part of thoſe matters would be indurated by the action of the atmoſphere, while the reſt would be carried down by the rain-waters, and again conveyed into the ocean. The torrents of rain-water which pour down the ſides of mount Etna have furrowed its ſides, by cutting out for themſelves channels; and they have removed from its ſummit, and are ſtill removing to a farther diſtance, all the extraneous bodies upon it. In many places, they flow at preſent over a channel of lava, having cut through all the matters which lay above it: ſtill, however, there remain in many places both calcareous matter and other marine productions, which ſhow that this volcano has been once covered by the waters of the ocean. But theſe are daily waſting away; not only the rains, but men likewiſe, who carry them off as materials for lime and for building, conſpire to deface them. Etna.

No fewer than 77 cities, towns, and villages, are ſcattered over the ſides of Etna. They are moſt numerous on the ſouth ſide, where the temperature of the air is milder than on the north. Reckoning thoſe cities, towns, and villages, one with another, to contain each 1200 or 1500 ſouls, the whole number of the inhabitants of mount Etna will then be 92,400, or 115,500. But it is certainly much more conſiderable.

On plate CLXXXIV. is exhibited a view of the north-eaſt ſide of the mountain, taken at ſea. The lower part preſents to the eye very extenſive plains entirely covered with lava of different thickneſs, on which vegetation has not yet made any progreſs. The nearer the ſhore the more barren is the ground; while the fertility of the ſoil increaſes as we advance farther inwards. The mountain is every where full of vaſt excavations; which our author conſiders as a proof, that inſtead of increaſing in bulk, it is actually in a ſtate of decay and diminution. The vaſt torrents of lava, which overſpread the ſides of it from time to time, he conſiders as inſufficient to repair the waſte occaſioned by rains, rivulets, and torrents flowing down from the ſummit. Unleſs the eruptions, therefore, become more frequent than they have been for ſome time paſt, he ſuppoſes that, by degrees, the height of the mountain muſt be reduced to that of the ſurrounding beds of lava. He had not an opportunity of meaſuring the altitude of Etna himſelf; but he obſerves that it had been done by the celebrated M. de Sauſſure, who found the elevation to be 10,036 feet. This was done on the 5th of June 1773, at 20 minutes after ſeven in the morning. The height of the barometer on the moſt elevated part at the brink of the crater was 18 inches $11\frac{1}{4}$ lines; which, by the neceſſary corrections, is reduced to 18 inches $10\frac{5}{6}$ lines. At the ſame time the mercury at Catania, placed only one foot above the level of the ſea, ſtood at 28 inches $2\frac{1}{16}$ lines; which muſt be reduced to 28 inches $1\frac{1}{8}$ lines, on account of the neceſſary corrections for the thermometer.

Fig. 1.

2 Account of the north-eaſt ſide of the mountain.

3 Suppoſed to be in a ſtate of decay.

4 Sauſſure's account of the height of Etna.

From Giana our author had an opportunity of contemplating the vaſt number of calcareous mounts ſcattered over that part of Etna; which (he ſays) "are nothing more than fragments, the ſlender remains of thoſe enormous maſſes which have been depoſited all around the baſe of mount Etna; and are a very curious monument of the revolutions which this mountain has undergone." They are of a true calcareous nature; and the inhabitants are accuſtomed to ſupply themſelves with limeſtone from them. They alſo uſe the ſtones of which theſe mounts are compoſed for the purpoſes of building; as the lava is ſo hard that it cannot be cut without the greateſt difficulty, and they have no other ſtone in theſe parts.

5 Mountains of calcareous matter.

Leaving this place, our author travelled over ſeveral extenſive plains of lava, covered on each ſide of the way with ſtunted trees, but without any cultivation; the lava being of that kind which is very unfavourable to the growth of vegetables. Arriving at St Leonardo, he obſerved the courſe of the eruption of water in 1755, and which is mentioned under the former article ÆTNA.

This

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ETNA. Plate CLXXXIV.

Fig. 1.

Fig. 2.

A. Bell Prin. Walt. Sculptor fecit.

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Etna.

This water took its courſe down the weſt ſide of the mountain; and the channel which it cut for itſelf is ſtill viſible. The eruption of water from burning mountains is ſtill much leſs frequent than that of lava or half vitrified ſolid matters, aſhes, &c. though that of water, and even mixed with the ſhells of marine animals (though we are not told whether it was ſalt or not), has ſometimes been obſerved in other volcanoes, particularly Veſuvius. The eruption we now ſpeak of happened in the month of February 1775. It was preceded by an exceedingly thick black ſmoke iſſuing from the crater, intermixed with flaſhes of fire. This ſmoke gradually became thicker, and the burſts of flame more frequent. Earthquakes and ſubterraneous thunder convulſed the mountain, and ſtruck the inhabitants of the adjacent parts with the utmoſt terror. On Sunday, the ſecond of March, the mountain was ſeen to emit a huge column of ſmoke exceedingly denſe and black, with a dreadful noiſe in the bowels of the earth, accompanied alſo with violent flaſhes of lightning. From time to time there were loud cracks, like the exploſions of cannon; the mountain appeared to ſhake from its foundations; the air on that ſide next Maſcali became very dark, and loud peals of thunder were heard. Theſe ſeemed to iſſue from two caverns, conſiderably below the ſummit, on the ſide of the mountain, and were accompanied with violent blaſts of wind like a tempeſt.

6 Particular account of the eruption of water in 1755.

Theſe terrible phenomena continued and increaſed; Etna ſeemed ready to ſwallow up at once all thoſe materials which it had been for ſo many years diſgorging, or rather about to ſink at once into the bowels of the earth from whence it appeared to have been elevated. The proſpect was far beyond any idea that can be given by deſcription of this tremendous ſcene. The inhabitants were alarmed beyond meaſure; the ſight of the flames driven by the wind againſt the ſides of the mountain, the ſhocks of the earthquake, and the fall of rocks, ſtruck the imagination with a horror not to be conceived. During this dreadful commotion an immenſe torrent of water was emitted from the higheſt crater of the mountain. The whole ſummit of Etna was at that time covered with a thick coating of ſnow. Through this the boiling water directed its courſe eaſtward; and, in its paſſage, met with frightful precipices. Over theſe it daſhed with the utmoſt violence, adding its tremendous roaring to the complicated horrors of this awful ſcene. The ſnow, melting inſtantaneouſly as the boiling torrent advanced, increaſed its deſtructive power by augmenting its quantity, while the miſchievous effects of the heat were ſcarce diminiſhed by reaſon of the immenſe quantity of boiling liquid which continued to pour from the ſummit of the mountain.

This boiling torrent having daſhed its awful cataracts from one chain of rocks to another, at length reached the cultivated plains, which it overflowed for a number of miles. Here it divided itſelf into ſeveral branches, forming as many deep and rapid rivers; which, after ſeveral other ſubdiviſions, diſcharged themſelves into the ſea.

Though the mountain continued to diſcharge water in this manner only for half an hour, the ravages of it were very terrible. Not only thoſe of common inundations, ſuch as tearing up trees, hurrying along rocks and large ſtones, took place here, but the ſtill more dreadful effects of boiling water were felt. Every cultivated ſpot was laid waſte, and every thing touched by it was deſtroyed. Even thoſe who were placed beyond the reach of the torrent, beheld with inexpreſſible horror the deſtruction occaſioned by it; and though the alarming noiſes which had ſo long iſſued from the mountain now ceaſed in a great meaſure, the ſhocks of earthquakes, and the violent ſmoke which continued to iſſue from the mountain, ſhowed that the danger was not over. Two new openings were now obſerved, and two torrents of lava began to make their way through the ſnow.

Etna.

On the 7th of March a dreadful noiſe was again heard in the bowels of the mountain, and a new column of very thick and black ſmoke began to iſſue from it. A horrid exploſion of ſmall ſtones ſucceeded; ſome of which were carried as far as the hills of Maſcali, and great quantities of black ſand to Meſſina, and even quite over the ſtrait to Reggio in Calabria. On the ſhifting of the wind to the northward this ſand reached as far as the plains of Agoſta. Two days after the mountain opened again, and a new torrent of lava was diſcharged; which, however, advanced very ſlowly towards the plain, moving only at the rate of a mile in a day. It continued to flow in this manner for ſix days, when every thing appeared ſo quiet, that the Canon Recupero ſet out to view the changes which had taken place.

7 Courſe of the torrent traced by Recupero.

That gentleman's deſign was to trace the courſe of the dreadful torrent of water above mentioned. This he was very eaſily enabled to do by the ravages it had made; and, by following the channel it had cut all the way from the ſea to the ſummit of the volcano, he found that this immenſe quantity of water had iſſued from the very bowels of the mountain. After iſſuing from the crater, and increaſing its ſtream by paſſing through and melting the ſnow which lay immediately below the ſummit, it deſtroyed in an inſtant a fine and extenſive foreſt of fir-trees. All of theſe were torn up by the violence of the current, though many were no leſs than 24 or 30 inches in diameter. He obſerved that the great ſtream had, in its deſcent, divided itſelf into four branches; and theſe had again ſubdivided themſelves into ſeveral ſmaller ones, eaſily diſtinguiſhable by the quantity of ſand they had depoſited. Afterwards reuniting their ſtreams, they formed many iſlands, and rivers 900 feet in breadth, and of a depth which could not eaſily be determined. Proceeding farther down, and ſtill forcing its way among the beds of old lava, the channel of the waters was widened to 1500 feet, until it was again contracted in the valleys as before. Every object which ſtood in the way of this tremendous torrent was moved from its place. Enormous rocks were not only hurried down, but ſeveral of them moved to more elevated ſituations than thoſe they formerly occupied. Whole hills of lava had been removed and broken to pieces, and their fragments ſcattered along the courſe of the river, and the valleys were filled up by vaſt quantities of ſand which the waters had depoſited. Our author obſerved, that even at the time he viſited the mountain, about 10 years after the eruption, the whole ſide of it ſtill bore the marks of this deluge.

On M. Houel's arrival at Jaci Catena, he inquired

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Etna.

for the phyſician of the place; it being cuſtomary for ſtrangers to do ſo who want to learn any thing concerning the curioſities of the country, as the phyſicians there are generally thoſe who have any pretenſions to literature. By this guide he was ſhown a well which they call *Holy Water*. There is a flight of ſteps from the ſurface of the ground to that of the water. The well itſelf is 20 feet wide and 40 feet deep. It is ſupplied by three different ſprings, each of which is ſaid to have a peculiar taſte. The phyſician informed our author, that one of them reſembled milk in its taſte; another taſted like ſoap; and the third had the taſte of common water: but our author, after taſting each of them, could not find any remarkable difference.

8 Account of a remarkable well.

9 Ancient baths diſcovered.

In his way to La Trizza, our outhor diſcovered ſome very ancient baths with ſtoves. They had been built here on account of a ſpring of warm ſulphureous water, ſuppoſed to be excellent for the cure of cutaneous diſorders; and for which purpoſe they are ſtill made uſe of. They are now called the *Springs of St Venera*, of whom there is an image here. The fountain from which they flow is on a level with the ſurface of the ground. The water taſtes very diſagreeably of ſulphur; and depoſits a quantity of white impalpable powder, adhering to herbs and ſtones, over which it paſſes. This ſubſtance our author calls the *cream of ſulphur*; though it is probably a ſelenitic ſubſtance formed by the decompoſition of the ſulphur, and the union of its acid with ſome calcareous matter which held it in ſolution before.

10 Springs of St Venera.

11 Baſaltic rocks about Trizza.

From this place our author proceeded to the ſea-port of Trizza, a ſmall place, which with the adjacent country contains only about 300 inhabitants. Off the harbour of this place is a baſaltic rock, which ſeems to be only the remains of a much larger one deſtroyed by the action of the air. All around are long ranges of baſaltes, the ſpecies of which are very various.

12 Rocks of the Cyclops.

The rocks of the Cyclops ſtand round the ſmall harbour of La Trizza; and from this view we perceive a number of rocks of very different heights. All of them appear more or leſs above water, though ſome are ſo low that they cannot be ſeen without approaching very near; and this circumſtance renders the harbour inacceſſible to veſſels of any conſiderable burden, at the ſame time that, by reaſon of the depth of the ſea, it is impoſſible either to cut or unite them by a mole. The principal of theſe rocks is the extremity of an iſland, one half of which is compoſed of lava placed on a baſaltic baſe; over this is a cruſt of pozzolano, combined with a kind of white calcareous matter of a pretty hard and compact conſiſtence; and which, by the action of the air, aſſumes the appearance of knotty porous wood. On this ſubject our author obſerves, that "the rock, at ſome former period, had become ſo hard as to ſplit, and the clefts were then filled up with a very hard matter which was porous on all ſides like ſcoriæ. That matter afterwards ſplit alſo; leaving large interſtices, which in their turn have been filled up with a kind of compound yellow matter. The iſland appears to have been formerly inhabited, but is at preſent deſtitute both of inhabitants and of culture, only the people of La Trizza feed a few goats upon it."

To the ſouthward of the harbour of La Trizza we obſerve ſeveral fragments of baſaltes, both in the form of needles and in that of priſmatic columns of a very regular form, and which may be eaſily ſeparated from one another. From the poſition in which theſe fragments are diſpoſed, it appears that the maſs to which they belong muſt have ſuffered ſome very violent ſhock; otherwiſe ſuch huge rocks could never have been broken, overturned, and ſcattered in directions ſo very different from their original poſitions. In one of theſe ruins there are ſome parts harder than the reſt, which withſtand the action of the air, while the intervening ſpaces yield to it, and appear to be thus deſtroyed. In ſome others this effect is much more remarkable; becauſe the column happens to be much farther advanced towards a ſtate of diſſolution, the parts of which they conſiſt being already disjoined; and in each of thoſe which project we perceive a fiſſure: which ſhows that each of theſe parts may be divided into two. "They are indeed (ſays our author) actually divided, and diſplay a convexity iſſuing from a concavity, like a pile of hats placed one upon another, when they are removed one by one; which is a very curious ſingularity."

Etna.

13 Different kinds of baſaltes.

14 Promontory of the Caſtel d'Aci deſcribed.

Continuing his journey ſtill ſouthward, our author arrived at the promontory of the Caſtel d'Aci. This is the moſt ſingularly curious of all that are in the neighbourhood of Etna. The ancient maſs of it is incloſed between two bodies of lava of a more modern origin. Theſe compoſe the rocks on which Caſtel d'Aci is ſituated, and which lie under the ſoil of the adjacent country. Beyond that city are the immenſe plains of the lower part of Etna. Theſe gradually riſe till they reach the ſummit, which is hid among the clouds. The promontory is almoſt entirely compoſed of baſaltes, the interſtices of which are filled up with a yellowiſh matter, which ſeems to be a clay nearly of the ſame nature with that formerly taken notice of in the iſland of La Trizza. It alſo covers the maſs of baſaltes, and has produced both the ſuperior and anterior parts of the promontory. Here our author ſaw a number of women employed in waſhing webs of cloth in the ſea; and takes notice of the dexterous method they have of lifting it up in folds, and packing it on their heads in bundles without receiving any aſſiſtance. At the foot of this promontory are many curious baſaltic rocks.

15 Great quantity of baſaltes found on Etna.

All along the eaſtern ſide of Mount Etna the ſoil is broken, but filled with beautiful varieties of baſaltes, highly worthy of obſervation. Indeed, according to our author's opinion, there is no volcano in Europe ſo rich as Etna in baſaltes, nor where ſo many curious figures of it are to be ſeen.

16 Mr Houel's journey to the great cheſnut-tree.

Mr Houel having ſpent ſome more time in viſiting the baſaltic columns around the foot of the mountain, ſet out from Aci to viſit the famous cheſnut-tree, mentioned under the article ÆTNA, and which is known in that country by the name of *The cheſnut-tree for an hundred horſes*. In his way thither he paſſed through the villages of Forteżza, Mangamo, St Leonardo, St Matteo, and La Macchia. The landſcapes of each of theſe places by itſelf are extremely beautiful; but the country between them is a frightful wild deſart, preſenting to the eye nothing but extenſive plains of black lava, which at a diſtance have the appearance of vaſt quantities of pit-coal. The roads became rougher as they,

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Plan of the Tree.

Erinaceus, or Hedgehog.

Common. Guinea. Malacca.

A. Bell Prin. Wal. Sculptor fecit.

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Etna.

they advanced; but the adjoining fields aſſumed a more ſmiling aſpect. The reaſon of this is, that the torrents of lava (by which the plains are rendered unfit for vegetation for a great number of years) have rolled rapidly down the more ſteep ſides of the mountain without deſtroying the fertility of the ſoil.

Travelling through very difficult roads, and often incommoded with dangerous precipices, our author at laſt arrived at the celebrated cheſnut-tree, which was the chief object of this journey. He obſerves, that all over this ſide of the mountain the cheſnut trees thrive very well, and are carefully cultivated by the inhabitants. They are worked into hoops for caſks, and a conſiderable trade is carried on in this article. The great one which he came to viſit, exceeds the ſize of other trees ſo much that it cannot fail to excite the greateſt admiration. It has its name from the following circumſtance. Jean of Arragon ſpent ſome time in Sicily on her way from Spain to Naples: While here, ſhe viſited Mount Etna, attended by her principal nobility; and happening to be overtaken by a ſtorm, they took ſhelter under this tree, whoſe branches were ſufficiently extenſive to cover them all. By others, however, this ſtory is treated as a mere fable.

17 Great number of cheſnuts trees cultivated on this ſide of Etna.

18 Particular account of the great tree.

According to our author's account, this cheſnut tree is 160 feet in circumference, but quite hollow within * which, however, affects not its verdure; for the cheſnut tree, like the willow, depends upon its bark for ſubſiſtence, and by age loſes its internal part. As the cavity of this enormous maſs is very conſiderable, the people have built an houſe in it, where they have an oven for drying nuts, almonds, and cheſnuts, &c. of which they make conſerves. They frequently ſupply themſelves with wood from the tree which incircles their houſe, ſo that it ſeems likely, in a ſhort time, to go to ruin through the ingratitude and thoughtleſſneſs of its inhabitants.

19 An houſe and oven built in the hollow of it.

It has been thought that this tree was compoſed of a number of others grown together; but our author is of a different opinion. In deſcribing it particularly, however, we muſt ſeparate it from the trunks *i*, *k*, *l*, (on the plan), which properly belong to three other trees. The dotted line, and the letters *a*, *b*, *c*, *d*, *e*, *f*, *g*, mark out the true circumference of the tree we ſpeak of. The parts of that circumference are not all contiguous, ſeveral pieces having been taken away from the places marked *g* and *n*, between which the houſe ſtands. In other places the bark is rent aſunder; but, ſays our author, "by a natural motion, the divided parts, ſeeking to reunite, or rather to ſhelter themſelves from the action of the external air, are bent inwards ſo as to form the circular arcs *a*, *b*, *c*, *d*, which may indeed be taken for ſo many different trees, though they appear properly to belong to the ſame trunk.

20 Is not compoſed of a number of trees grown together.

Plate CLXXXV.

Beſides this, there are abundance of other trees in the neighbourhood very remarkable for their ſize. Our traveller was ſhown a number of young trees of the ſame ſpecies, all very beautiful and ſtraight, and almoſt as ſmooth as poliſhed marble. One of theſe was 38 feet in circumference, and there were a number of others nearly of the ſame ſize. Among theſe there were ſeven ſtanding together, which have received the name of the *ſeven brethren*. Another is denominated *the ſhip*, from the general figure of its top, which has ſome ſlight reſemblance to a ſhip. Its diameter is 25 feet, ſo that the circumference cannot be leſs than 75. In theſe extenſive foreſts, however, there are cheſnut trees of every age and ſize.

21 Other trees of vaſt dimenſions.

Our author's next viſit was paid to a ſnow grotto, being one of thoſe magazines where that article, ſo neceſſary in the hot climate of Sicily, is preſerved for uſe. In his way thither he viſited the foreſt of pines; which is ſo much ſurrounded by rocks and precipices, that it is ſcarce acceſſible; and vaſt numbers of the trees are dying of old age. Some of the neighbouring peaſants, however, will now and then attempt to carry them off. Our author ſaw one of them at this work. It was drawn by oxen, who were yoked to it by a chain connected with the beam by an iron cramp. But the extreme roughneſs of the road made the tree leap and bound in ſuch a manner, that the poor creatures were every moment in danger of having their legs broken, or being hurried over precipices along with their driver; accidents which happen not unfrequently, and which render this occupation leſs generally practiſed than otherwiſe it would be.

22 Snow grotto deſcribed.

23 Foreſt of pines in the way to it.

The ſnow grotto is but lately formed by the action of the waters under the beds of lava, and carrying away the ſtratum of pozzolana below them. It is ſituated on a mount named *Finocchio*, which, though of very conſiderable ſize, is only a protuberance on the ſide of Etna. It has been repaired in the inſide at the expence of the knights of Malta, who have hired this as well as ſeveral other caverns in the mountain for the purpoſe of holding ſnow, which they have ſtill more occaſion for in their iſland than the inhabitants of Sicily. There are two openings above, at which they throw in the ſnow; and flights of ſteps have been cut to theſe as well as in the internal parts. A conſiderable extent of ground is levelled and incloſed with high walls above the grotto; ſo that when the wind, which at this elevation blows with great violence, carries the ſnow down from the higher parts of the mountain, it is ſtopped and detained by the walls of this incloſure. It is then thrown into the grotto, where the thickneſs of the beds of lava which cover it prevents any impreſſion from the ſummer-heat. When the ſeaſon for exportation comes on, the ſnow is put into large bags, and preſſed into them as cloſe as poſſible. Thus it is rendered compact and heavy, and likewiſe runs leſs riſk of being affected by the heat. It is then carried out upon mens ſhoulders, and conveyed to the ſhore on mules. Before it is put into the bags, the lumps of ſnow are carefully wrapped up in leaves, which is another preſervative; at the ſame time that the freſh congelation of the little which melts, unites the maſſes ſo together, that our author informs us he has ſeen pieces of the ſnow preſerved in this manner which looked like the faireſt and moſt tranſparent cryſtal.

24 How the ſnow is prevented from melting during exportation.

Our author's next excurſion was to Mount Roſſo, or the Red Mountain, which is one of the mouths of Etna, and through which it diſcharges from time to time great quantities of lava, ſand, aſhes, &c. It is the moſt celebrated of all the numerous mouths which have opened on the ſide of the mountain, though it has become ſo noted only for having poured forth the matter of the great eruption in 1669, and which is the moſt remarkable of any recorded in hiſtory.

25 Account of mount Roſſo.

"When a new crater (ſays our author), is formed on

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Etna.

on mount Etna, it is always in conſequence of ſome ſhock that is powerful enough to break the arches of its caverns. Doubtleſs it is inconceivable that there ſhould be any agent endowed with ſuch force; but when ſuch a fracture is once made, it is neceſſarily very large, and the ſurface of the ground above cannot but be broken in ſeveral different places at conſiderable diſtances from one another. The matter which is diſcharged always iſſues from the principal opening and thoſe adjoining to it. None of theſe mouths, however, continue open, excepting that which is directly in the line in which the matter is diſcharged; the lava ſoon choaking up thoſe which are in a more oblique direction."

26 New craters how formed.

Our author went down one of theſe openings with torches; but could not reach the bottom, and was obliged to return on account of the extreme cold. The deſcent was extremely difficult, and became more ſo in proportion as he advanced. This crater is of an oval form, and the opening through which he deſcended was in one extremity: but he was tempted to think that the crater which riſes above it had been formed of matter diſcharged by another mouth; or perhaps it might have had a more centrical opening, through which the ſtones, ſand, &c. which form the crater, were diſcharged.

Four of the mouths of this mount appear to be compoſed of a reddiſh pozzolano, which has procured it the name of the *Red Mountain*: but when we aſcend the pyramids, or rather funnels which they form, we find them compoſed of different coloured layers of ſand. Some of theſe are of a bluiſh grey colour, others of a fine yellow, and ſome of a kind of green formed by a mixture of grey and yellow, while others are of a red colour. A great number of ſmall cryſtals, black ſchoerls, and granites, are found among them, as well as pieces of ſcoria, which had been diſcharged by the volcano in the form of a thick and glutinous matter. All theſe mouths have internally the form of a funnel, and their ſhape is nearly that of a mutilated cone or round pyramid. This is the natural and unavoidable conſequence of the perpendicular fall of the pulveriſed matter which the volcano diſcharges from the orifice at the bottom. The ſides of the craters are not all of one height; the parts to the eaſt and weſt being conſiderably higher than the intermediate ſummits, becauſe the currents of the aſhes paſſed alternately from eaſt to weſt, and fell upon theſe ſides in greater quantities than on the others; which circumſtance has given to this volcano the appearance of having two ſummits.

27 Convent of Nicoloſi deſcribed.

M. Houel, having finiſhed his obſervations on Monte Roſſo, returned to the convent of Nicoloſi, which is now only an houſe for the entertainment of travellers. The Benedictines of Catana, to whom it belongs, viſit this place only when in an ill ſtate of health, as the purity of the air renders it very ſalutary to the human conſtitution. A ſolitary brother, however, reſides here to take care of the houſe, and to ſuperintend the cultivation of the neighbouring plains. Thoſe fathers once poſſeſſed an extenſive and very fertile tract of land in this neighbourhood; but the eruptions of Etna have rendered it totally incapable of cultivation. This houſe ſtands at a very conſiderable height, being no leſs than 2496 feet above the level of the ſea. Setting out from this place three hours before day, our traveller directed his courſe towards the grotto of the goats. In his way thither, he paſſed over ſeveral plains of lava, ſome of them ancient and others more modern: but the roads were extremely rough and dangerous; or rather, as our author expreſſes himſelf, there was no track or path meriting the name of a road. In two hours they reached the Regione Sylvoſa, where an immenſe foreſt ſurrounds the mountain, and which has undoubtedly been planted by the hand of nature: for the ground there is ſo high, ſo full of precipices, and ſo entirely uninhabitable, that no human being could ever think of making plantations on it; nor is it to be ſuppoſed that the winds could take up ſeeds from the plains to ſow them on ſuch a lofty ſituation.

Etna.

28 Grotto of the goats deſcribed.

29 Regione Sylvoſa deſcribed.

Theſe majeſtic foreſts of Etna afford a ſingular ſpectacle, and bear no reſemblance to thoſe of other countries. Their verdure is more lively, and the trees of which they conſiſt are of a greater height. Theſe advantages they owe to the ſoil whereon they grow; for the ſoil produced by volcanoes is particularly favourable to vegetation, and every ſpecies of plants grows here with great luxuriance. In ſeveral places where we can view their interior parts, the moſt enchanting proſpects are diſplayed. The hawthorn trees are of an immenſe ſize. Our author ſaw ſeveral of them of a regular form, and which he was almoſt tempted to take for large orange-trees cut artificially into the figures they repreſented. The beeches appear like as many ramified pillars, and the tufted branches of the oak like cloſe buſhes impenetrable to the rays of the ſun. The appearance of the woods in general is exceedingly picturеſque, both by reaſon of the great number and variety of the trees, and the inequality of the ground, which makes them riſe like the ſeats in an amphitheatre, one row above another; diſpoſing them alſo in groups and glades, ſo that their appearance changes to the eye at every ſtep: and this variety is augmented by accidental circumſtances, as the ſituation of young trees among others venerable for their antiquity; the effects of ſtorms, which have often over-turned large trees, while ſtems ſhooting up from their roots, like the Lernæan hydra, ſhow a number of heads newly ſprung to make up that which was cut off.

30 Beautiful appearance of the foreſts of Etna.

About three hours after the departure of our travellers from St Nicholas, they reached the grotto of the goats. It is formed by a bed of lava, which having flowed over a pile of ſand and pozzolana while in a fluid ſtate, ſettled and cooled in that ſituation; and the ſand or pozzolana being afterwards carried off by the filtration of water through the lava, a void ſpace has been left, which the torrents have gradually enlarged to its preſent ſize.

31 Grotto of the goats, how formed.

This grotto ſtands about 5054 feet above the level of the ſea, according to the calculations of M. de Sauſſure. It affords a retreat for thoſe travellers who viſit the ſummit of Etna, who generally refreſh themſelves by taking a repaſt and making a fire at the entry, for which there is plenty of dry wood at hand; while the ſand ſerves for a bed to repoſe on. Here our author and his company ſupped, and about midnight ſet off for the ſummit. They had the advantage of the moon-light; and our author adviſes all thoſe who intend to viſit the top of Etna to take ſuch a time for their journey as may enable them to enjoy this advantage.

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Etna.

tage. As they advanced beyond the grotto of the goats, the trees became gradually thinner. In a ſhort time they were ſo thin, that they might readily be counted; and, proceeding ſtill farther, only a very few were ſeen ſcattered here and there, whoſe beauty and ſize were diminiſhed ſeemingly in proportion to their numbers. A few clumps of trees and ſome tufts of odoriferous herbs were now only to be ſeen; and in a little time theſe alſo became thinner, aſſuming a withered or ſtunted appearance. Then they are nothing but the languiſhing remains of an abortive vegetation; and a few paces further not even this appeared, the eye being preſented only with barren ſand.

32 Account of the higheſt parts of Etna.

33 Snowy and barren region deſcribed.

Having now got above the region of the trees, they entered the third, which our author denominates the region of ſnow and ſterility. The wind became more briſk and keen as they advanced, ſo that they could ſcarce keep their hats upon their heads; and our author loſt his, though tied on with an handkerchief. Here they were frequently obliged to croſs conſiderable ſtreams of water formed by the melting of the ſnow. In general the ſurface was ſufficiently hard to bear them; but our author's mule once ſunk up to her belly, and was not extricated without great difficulty.

34 Plain on the ſummit of Etna.

Having at laſt overcome all difficulties, they arrived at the large plain on the ſummit of Etna, and in the midſt of which is the crater of the volcano. It is entirely compoſed of lava, cinders, ice, and ſnow; nevertheleſs is ſtyled, ironically as our author thinks, *Monte Frumente*. Here the wind continued to blow with exceſſive violence; and our author informs us, that in order to have any notion of its keenneſs, we muſt be accuſtomed to feel it on ſome very elevated ſtation, as it is impoſſible to judge from what we feel at inferior altitudes. They took ſhelter behind a lump of lava, the only one which appeared in the whole plain, and, which our author ſays, would ſeem deſigned expreſsly for the ſhelter of travellers. Here they lay, wrapped up in their cloaks, for an hour; but as ſoon as it was day, ſo that they could diſtinguiſh the place where the ſun was to riſe, they got up and advanced towards the ruins of the building known by the name of the *Philoſopher's Tower*. The wind ſtill blew ſo violently, that after an effort of four minutes they fell down exhauſted: but the extreme cold obliging them again to get up, they made a ſecond attempt; and after ſeveral intermiſſions of this kind, at laſt accompliſhed their deſign. They were ſurpriſed, however, to find nothing but the corner of a wall not more than two feet high, conſiſting of two rows of unpoliſhed ſtones; great part of it having been probably buried by the ſand and other matters diſcharged by the mountain. Here, being ſheltered from the wind, and the day advancing, they began to enjoy the glorious proſpect which every moment became more extenſive. At the riſing of the ſun, the horizon was ſerene, without a ſingle cloud.

35 Wind exceſſively violent here.

37 Extenſive and glorious proſpect from the ſummit.

"The coaſt of Calabria (ſays our author) was as yet undiſtinguiſhable from the adjoining ſea; but in a ſhort time a fiery radiance began to appear from behind the Italian hills, which bounded the eaſtern part of the proſpect. The fleecy clouds, which generally appear early in the morning, were tinged with purple; the atmoſphere became ſtrongly illuminated, and, reflecting the rays of the riſing ſun, appeared filled with a bright effulgence of flame. The immenſe elevation of the ſummit of Etna made it catch the firſt rays of the ſun's light, whoſe vaſt ſplendor, while it dazzled the eyes, diffuſed a moſt cheriſhing and enlivening heat, reviving the ſpirits, and diffuſing a pleaſant ſenſation throughout the ſoul. But though the heavens were thus enlightened, the ſea ſtill retained its dark azure, and the fields and foreſts did not yet reflect the rays of the ſun. The gradual riſing of this luminary, however, ſoon diffuſed his light over the hills which lie below the peak of Etna. This laſt ſtood like an iſland in the midſt of the ocean, with luminous points every moment multiplying around, and ſpreading over a wider extent with the greateſt rapidity. It was as if the univerſe had been obſerved ſuddenly ſpringing from the night of non-exiſtence. The tall foreſts, the lofty hills, and extenſive plains of Etna, now preſented themſelves to view. Its baſe, the vaſt tracts of level ground which lie adjacent, the cities of Sicily, its parched ſhores, with the daſhing waves and vaſt expanſe of the ocean, gradually preſented themſelves, while ſome fleeting vapours, which moved ſwiftly before the wind, ſometimes veiled part of this vaſt and magnificent proſpect." In a ſhort time every thing was diſplayed ſo diſtinctly, that they could plainly recognize all thoſe places with which they were before acquainted. On the ſouth were ſeen the hills of Camerata and Trapani; on the north, the mounts Pelegrino and Thermini, with the celebrated Enna once crowned with the temples of Ceres and Proſerpine. Among theſe mountains were ſeen a great many rivers running down, and appearing like as many lines of glittering ſilver winding through a variety of rich and fertile fields, waſhing the walls of 20 cities, while their banks were otherwiſe filled with villages, hamlets, &c. riſing among the ruins of the moſt illuſtrious republics of antiquity. On the ſouth and north were obſerved the rivers which bound by their courſe the vaſt baſe of mount Etna, and afford a delightful proſpect to the eye; while at a much greater diſtance were ſeen the iſles of Lipari, Alicudi, Felicocide, Parinacia, and Stromboli.

Having enjoyed for ſome time the beauty of this magnificent proſpect, our author ſet about making a draught of the place from which the view was taken; and at length accompliſhed it, notwithſtanding the great impediments he met with from the wind. Among the objects which he delineated on this occaſion, the Philoſopher's Tower was one. It ſeems, he ſays, not to be very ancient; neither the materials of which it conſiſts, nor the mode of architecture, bearing any reſemblance to thoſe of the Greeks and Romans. The ſurrounding plain ſeems to conſiſt entirely of a black ſand intermixed with pieces of ſcoria, which have been formerly thrown out by the volcano. Beyond that plain, which riſes gently, appears a cone, the ſummit of which is the volcanic crater. When viewed from the ſouth ſide, on which they ſtood, this crater ſeems to conſiſt of a number of ſmall hills. Into theſe it was broken by the emiſſion of the boiling torrent in the year 1755. When diſcharged from the crater, theſe waters ſpread towards the right, and at the diſtance of a mile eaſtward fell in a caſcade from a prodigious height.

38 Philoſopher's tower deſcribed.

39 Deſcription of the great crater.

The violence of the wind beginning now to abate a little, the travellers ſet out for the very ſummit, in order to take a view of the great crater; in which journey

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Etna.

(our author says) it would be difficult to make people, who have never engaged in such enterprises, comprehend all the obstacles they had to encounter. This cone (the little mountain mentioned by Sir William Hamilton) is composed of ashes, sand, and pozzolano, thrown up at different times by the volcano. The materials are so loose, that the adventurous traveller sinks about mid-leg at every step, and is in constant terror of being swallowed up. At last, when the summit is reached, the sulphureous exhalations, which are continually emitted from the pores of the mountain, threaten suffocation, and irritate the fauces and lungs in such a manner as to produce a very troublesome and incessant cough. The looseness of the soil, which gives way under the feet, obliges the traveller, every now and then, to throw himself flat on his belly, that so he may be in less danger of sinking. In this posture our author viewed the wide unfathomable gulph in the middle of the crater; but could discover nothing except a cloud of smoke, which issued from a number of small apertures scattered all around, and accompanied with a kind of noise. Another and more dreadful sound, however, issues from the bowels of the volcano, and which, according to our author, "strikes the heart with terror, so that all the strength of reason is necessary to prevent the observer from flying with precipitation from such a dreadful place." Several travellers who had visited this cone before him, were so terrified by these dreadful sounds, that they fled with the utmost haste till they arrived at the foot of the mountain.

40 Description of the horrid noises continually issuing from the burning gulph.

Our author compares these sounds to a discharge of cannon in the wide abyss; the noise of which is rebellowed throughout all the caverns, and produce a sound perhaps the most alarming that can be imagined; and during the short space in which he listened, several of these discharges were heard to follow one another almost uninterruptedly.

This dreadful noise, our author, with very great probability, supposes to be occasioned by the explosions of the internal fire, or, as he calls it, the *focus* of the volcano; which, striking against the sides of these immense caverns, the sounds produced are re-echoed through their cavities, and probably multiplied in an extraordinary manner; so that what would be only a slight explosion in the open air, occasions a sound more tremendous than the loudest thunder. To such as are convinced of this, and have sufficient courage to resist the first impressions which these sounds must unavoidably occasion, they will in a short time not only appear exceedingly sublime, but, by their variety, even somewhat agreeable. "They enable us (says our author) to form some conception of the space through which they must pass before they reach the ear, and of the vast extent and width of the hollows of the mountain."

41 Impossible to walk round the crater.

Having for some time contemplated this awful spectacle, our author wished to measure the crater by walking round it; but found this impossible. On the north side the surface is hard and smooth, the ashes having been so far dissolved by the moisture deposited by the smoke as to cement into one uniform mass. This is sometimes dissolved even into a fluid state, in such a manner as to run down the sides of the cone; so that after several attempts, he was at last obliged to abandon his design.

Plate CLXXXIV.

Fig. 2. exhibits a view of the crater of Etna taken on the brink of the east side. The fore-ground (*a a*) of the figure is one division of the crater. Beyond it are two eminences *b* and *c*, higher than that on which some human figures are represented. All the three form a triangle nearly equilateral; but, when viewed from any considerable distance, only two of them can be seen; for which reason the Sicilians have termed the mountain *bicornæ*, or double-horned.

Etna.

42 Explanation of the figure of the crater.

The smoke, as represented in the figure, issues from all quarters, either from chinks or holes scattered over the whole crater. But the situation of the principal mouth is in the midst of the three eminences. Its diameter, when our author visited this mountain, was only about 60 feet, and so filled with smoke that nothing remarkable could be discovered. From the height *d*, the rock situated on the left side of the print, and on which the human figures are represented, all the way to the rock *e* on the right, the distance is no more than 900 feet. Our author observed that the cone is not exactly in the middle of the plain, but is situated more towards the north than the south. He did not attempt to cross the central valley *f*, on account of the looseness of the ground, and that there was no object apparently worthy of the risk he must run in so doing. At the nearest view he took, it was only observed that there was snow lying in several parts of it, though the heat which otherwise prevailed seemed to be very intense.

The smoke which issues from the crater of Etna is generally carried in a direction from south to north; and, as it brings along with it a considerable quantity of water, the latter, condensed by the cold winds, runs down the side of the mountain in plentiful streams, and often leaves pretty permanent marks of its course. In this manner he accounts for the great eruption of water in 1755, which he supposes to have been occasioned only by an unusual quantity of water falling into the burning focus of the mountain, there rarefied into steam, and afterwards condensed by the coldness of the atmosphere.

43 Eruption of water in 1755 accounted for.

Like other travellers to mount Etna, this gentleman found the wind blowing from the south; and he is of opinion, that a southwind blows here more frequently than any other, as he did not observe any channels cut by the water on any other side than the north. He had several opportunities of making this observation, having frequently visited the top of Etna, and always paid attention to the crater. The sand on the east and west sides was always loose, while that on the north was compacted into a solid body. The three summits were of a later date than the rest of the crater, having been probably thrown up by some eruption which had burst it asunder. The black spots on the fore-ground represent a number of hillocks about the size of mole-hills, from which a sulphureous vapour constantly issues, and by which the adjacent ground is tinged of an ochery colour. This vapour issues from the crevices with a kind of hollow whistling noise; which with the volcanic thunder, smoke, and noxious smell, render it very disagreeable to stay here even for a few moments.

44 South wind generally prevalent on the top of Etna.

The smoke is represented in the figure precisely as it did on the day that he ascended, which was very warm. But it does not always rise in this manner; for when the cold is very intense, it collects into a body, and thickens around the edge of the crater: on which occasions it is condensed into water, which diffuses itself around the edge of the crater, and mixing with the ashes

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Etna.

ashes converts them into a kind of clay. The cold on the top of this mountain is so intense, that travellers very often find their clothes insufficient to protect them; and it is remarkable that such intense cold is always produced by a south wind. The day that our author took his draught, the wind blew faintly from the north.

45 Intense cold produced by a south wind.

46 Account of the strata at the foot of Mount Etna.

The base of mount Etna, according to M. Houel's observations, consists of alternate layers of lava and marine substances, which have been deposited successively one upon another. These alternate layers extend to an unknown depth. They must indeed go as far down as the level of the stratum of lava which was discharged by the volcano at its first origin. The last deposited by the sea is a range of calcareous mountains of a considerable height, and which are placed on a basis of lava. Beneath that layer of lava is another of sea-pebbles, which are well known to be rounded by their attrition against one another by the motion of the waves. This layer is of considerable depth, and lies upon a yellowish rock consisting of a species of indurated sand. The river Simeto flows over this rock, which it has cut away considerably. That part which is at present the bed of the river is much higher than the base of Etna that is on a level with the sea; and not the least thing occurs to suggest an idea of what has been the primary base of the volcano. The marine substances, already taken notice of, lie nearly in an horizontal direction, more or less so according to the nature of the surface on which they have been deposited.

47 Great number of springs on Mount Etna.

Etna abounds very much with springs, fountains, and even rivers of considerable magnitude. Our author has computed, that if all the water flowing down the sides of this mountain were collected, it would fill the channel of a river 36 feet broad and 6 in depth. Many of the springs afford fine salt; some are very pure, and others are impregnated with noxious substances; while others are remarkable for their use in dyeing particular colours.

48 Whence such a large quantity of water is derived.

"It is worthy of notice (says our author), that streams of water, some of them more copious, others more scanty, are seen to issue at all different degrees of height, from the base to the summit of the mountain. Even in summer, when very little rain falls for three or four months, or when perhaps for that space there is no rain at all, and for three of which at least there is not an ounce of snow melted; even then a great number of rivulets continue to flow down the sides of Etna; and at the same time a number of streams, external and subterraneous, each of them several feet wide, are, according to the accounts of the country people, plentifully supplied with water.

"As the trifling quantity of snow which is melted here even in the midst of summer, and the still smaller quantity deposited by the clouds, would be totally insufficient to supply those streams, and must be all absorbed by the earth for the support of vegetation, those streams must proceed from some other cause, whose effects are more copious and permanent. This cause is the evaporation of those aqueous particles which arise from the constant ebullition at the bottom of the volcanic focus. These issuing out at the great crater, and at innumerable chinks in the sides of the mountain, are soon condensed by the cold of that elevated region of the atmosphere,

49 Produced by the internal evaporation of the mountain.

and, percolating through the earth, give birth to those numerous streams in question.

Etna.

"A volcano, according to my ideas, cannnot subsist without water; nor can water occupy a place in any volcanic focus without being changed into vapour. But before that water can make its appearance, except in the form of smoke, it must have filled the whole volcanic cavern, and must have been forcibly pressed by the action of the fire against its sides: it must next have condensed, and assumed the form of water; in which state it must have penetrated through the inclined layers of sand and pozzolano which intervene betwixt the different strata of lava; for these strata lie one above another, and are full of chinks, in such a manner as to present to the eye an appearance pretty much resembling that of the inside of a tiled roof."

50 Eruptions of Etna more frequent anciently than now.

It has been a question, Whether the eruptions of mount Etna were more frequent in ancient than in modern times? At first it seems impossible to give a precise answer to such a question; but when we consider, that the matter in the volcanic focus was then greater in quantity than at present, in proportion to the space which it occupied; that the cavities were then sooner filled with vapour; and that the centre of the focus was then less remote, we will not hesitate to pronounce, that in earlier times the eruptions were more frequent as well as more copious.

We shall close this article with an enumeration of all the different eruptions from mount Etna which are found upon record.

51 List of eruptions from the earliest period.

1. The first mentioned in history, is that of which Diodorus Siculus speaks, but without fixing the period at which it happened. That eruption, says he, obliged the Sicani, who then inhabited Sicily, to forsake the eastern, and retire to the southern, part of the island. A long time after that, the Sicilians, a people of Italy, migrated into Sicily, and took up their abode in that part of the island which had been left desert by the Sicani.

2. The second eruption known to have issued from this volcano, is the first of the three mentioned by Thucydides; of none of which he fixes the date, mentioning only in general, that from the arrival of the first Greek colonies that settled in Sicily (which was in the 11th Olympiad, and corresponds to the 734th year before the Christian era), to the 88th Olympiad, or the year 425 before Christ, Etna at three different times discharged torrents of fire. This second eruption happened, according to Eusebius, in the days of Phalaris, in the 565th year before the Christian era. The assertion of Eusebius is confirmed by a letter from that tyrant to the citizens of Catania, and the answer of the Catanians (if, after Bentley's Dissertations against their authenticity, any credit be due to the Epistles of Phalaris). But Diodorus gives both these pieces.

3. The third, which is the second of the three mentioned by Thucydides, happened in the 65th Olympiad, in the 477th year before the Christian era, when Xantippus was archon at Athens. It was in this same year the Athenians gained their boasted victory over Xerxes's general Mardonius near Platæa. Both the eruption of the volcano and the victory of the Athenians are commemorated in an ancient inscription on a marble table which still remains. An ancient medal ex-

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Etna. exhibits a repreſentation of an aſtoniſhing deed to which that eruption gave occaſion. Two heroic youths boldly ventured into the midſt of the flames to ſave their parents. Their names, which well deſerved to be tranſmitted to future ages, were Amphinomus and Anapius. The citizens of Catania rewarded ſo noble a deed with a temple and divine honours. Seneca, Silius Italicus, Valerius Maximus, and other ancient authors, mention the heroiſm of the youths with juſt applauſe. Etna.

4. The fourth eruption, the third and laſt of thoſe mentioned by Thucydides, broke out in the 88th Olympiad, in the 425th year before the Chriſtian era. It laid waſte the territory of Catania.

5. The fifth is mentioned by Julius Obſequens and Oroſius, who date it in the conſulſhip of Sergius Fulvius Flaccus and Quintus Calpurnius Piſo, nearly 133 years before the Chriſtian era. It was conſiderable; but no peculiar facts are related concerning it.

6. In the conſulſhip of Lucius Emilius Lepidus and Lucius Aurelius Oreſtes, in the 125th year before the Chriſtian era, Sicily ſuffered by a violent earthquake. Such a deluge of fire ſtreamed from Etna as to render the adjoining ſea into which it poured abſolutely hot. Oroſius ſays, that a prodigious quantity of fiſhes were deſtroyed by it. Julius Obſequens relates, that the inhabitants of the iſles of Lipari eat ſuch a number of thoſe fiſhes, as to ſuffer, in conſequence of it, by a diſtemper which proved very generally mortal.

7. Four years after the laſt mentioned, the city of Catania was deſolated by another eruption not leſs violent. Oroſius relates, that the roofs of the houſes were broken down by the burning aſhes which fell upon them. It was ſo dreadfully ravaged, that the Romans found it neceſſary to grant the inhabitants an exemption from all taxes for the ſpace of ten years, to enable them to repair it.

8. A ſhort time before the death of Cæſar, in the 43d year before Jeſus Chriſt, there was an eruption from mount Etna. Livy mentions it. It was not diſtinguiſhed by any thing extraordinary. It was afterwards conſidered as an omen of the death of Cæſar.

9. Suetonius, in the life of Caligula, mentions an eruption from mount Etna which happened in the 40th year after the Chriſtian era. The emperor fled on the very night on which it happened, from Meſſina, where he at that time happened to be.

10. Carrera relates, that in the year 253, there was an eruption from mount Etna.

11. He ſpeaks of another in the year 420; which is alſo mentioned by Photius.

12. In the reign of Charlemagne, in the year 812, there was an eruption from Etna. Geoffroy of Viterbo mentions it in his Chronicle.

13. In the year 1169, on the 4th of February, about day-break, there was an earthquake in Sicily, which was felt as far as Reggio, on the oppoſite ſide of the ſtrait. Catania was reduced by it to ruins; and in that city more than 15,000 ſouls periſhed. The biſhop, with 44 monks of the order of St Benedict, were buried under the ruins of the roof of the church of St Agatha. Many caſtles in the territories of Catania and Syracuſe were overturned; new rivers burſt forth, and ancient rivers diſappeared. The ridge of the mountain was obſerved to ſink in on the ſide next Taormina. The ſpring of Arethuſa, ſo famous for the purity and ſweetneſs of its waters, then became muddy and brackiſh. The fountain of Ajo, which riſes from the village of Saraceni, ceaſed to flow for two hours; at the end of which the water guſhed out more copiouſly than before. Its waters aſſumed a blood colour, and retained it for about an hour. At Meſſina, the ſea, without any conſiderable agitation, retired a good way within its ordinary limits; but ſoon after returning, it roſe beyond them, advanced to the walls of the city, and entered the ſtreets through the gates. A number of people who had fled to the ſhore for ſafety were ſwallowed up by the waves. Ludovico Aurelio relates, that the vines, corn, and trees of all ſorts, were burnt up, and the fields covered over with ſuch a quantity of ſtones as rendered them unfit for cultivation. Etna.

14. Twelve years after this, in the year 1181, a dreadful eruption iſſued from Etna on the eaſt ſide. Streams of fire ran down the declivity of the mountain, and encircled the church of St Stephen, but without burning it.

Nicolas Speciale, who relates, though he did not ſee, this event, was witneſs to another conflagration on Etna 48 years after this, in the year 1329, on the 23d of June, of which he has given a deſcription.

15 On that day, ſays he, about the hour of veſpers, Etna was ſtrongly convulſed, and uttered dreadful noiſes; not only the inhabitants of the mountain, but all Sicily, were ſtruck with conſternation and alarm. On a ſudden, a terrible blaze of fire iſſued from the ſouthern ſummit, and ſpread over the rocks of Mazarra, which are always covered with ſnow. Together with the fire, there appeared a great deal of ſmoke. After ſun-ſet, the flames and the ſtones that iſſued out with them were ſeen to touch the clouds. The fire making way for itſelf with the moſt furious impetuoſity, burnt up or reduced to ruins all thoſe ſtructures which the piety of former times had conſecrated to the Deity. The earth yawning, ſwallowed up a great many ſprings and rivulets. Many of the rocks on the ſhore of Maſcali were ſhaken and daſhed into the ſea. A ſucceſſion of theſe calamities continued till the 15th of July, when the bowels of Etna were again heard to rebellow. The conflagration of Mazarra ſtill went on unextinguiſhed. The earth opened near the church of St John, called *Il Paparinecca*; on the ſouth ſide fire iſſued from the gap with great violence: to add to the horrors of the day, the ſun was obſcured from morning to evening with clouds of ſmoke and aſhes, as entirely as in an eclipſe. Nicolas Speciale went towards the new-opened crater, to obſerve the fire and the burning ſtones which were iſſuing from the volcano. The earth rebellowed and tottered under his feet; and he ſaw red-hot ſtones iſſue four times ſucceſſively in a very ſhort ſpace from the crater, with a thundering noiſe, the like of which, he ſays, he had never before heard.

In a few days after this, all the adjacent fields were burnt up by a ſhower of fire and ſulphureous aſhes; and both birds and quadrupeds being thus left deſtitute of food, died in great numbers. A great quantity of fiſhes likewiſe died in the rivers and the contiguous parts of the ſea. "I cannot think (ſays he) that either Babylon or Sodom was deſtroyed with ſuch awful.

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Etna. ful ſeverity." The north winds, which blew at the time, carried the aſhes as far as Malta. Many perſons of both ſexes died of terror.

16. Scarce had four years elapſed after this terrible event, when Etna made a new exploſion, and diſcharged vollies of ſtones, cauſing the neighbouring fields to tremble. This happened in the year 1333.

17. Forty-eight years after this, on the 25th of Auguſt 1381, an eruption from Etna ſpread its ravages over the confines of the territory of Catania, and burnt up the olive-yards in the neighbourhood of that city.

18. In the year 1444, 63 years after the laſt eruption, a torrent of lava iſſued from Etna and ran towards Catania. The mountain ſhook; and the ſhocks were ſo violent, that ſeveral huge maſſes of rock were broken from its ſummit, and hurled into the abyſs with a tremendous noiſe.

19. After this Etna was ſcarce at reſt for 18 months or 2 years. On Sunday the 25th of September 1446, about an hour after ſun-ſet, an eruption iſſued from the place called *La Pietra di Mazarra*. This eruption was ſoon over.

20. On the following year, 1447, on the 21ſt of September, there was another, with a good deal of fire; but this eruption was likewiſe of ſhort duration.

21. Etna now ceaſed to emit fire, and that for a conſiderable time. The neighbouring inhabitants not only aſcended to the ſummit of the mountain, but even, if we may credit accounts, went down into the fiery gulph, and believed the volcanic matter to be now exhauſted: But on the 25th of April 1536, near a century from the ſlight eruption in 1447, a ſtrong wind aroſe from the weſt, and a thick cloud, reddiſh in the middle, appeared over the ſummit of the mountain. At the very ſame inſtant a large body of fire iſſued from the abyſs, and fell with the noiſe and rapidity of a torrent along the eaſtern ſide of the mountain, breaking down the rocks, and deſtroying the flocks and every other animal that was expoſed to its fury. From the ſame crater, on the ſummit of the mountain, there iſſued at the ſame time a ſtream of fire more terrible than the other, and held its courſe towards the weſt. It run over Bronte, Adrans, and Caſtelli. It conſiſted entirely of ſulphur and bitumen. On the ſame day the church of St Leon, which ſtood in a wood, was firſt demoliſhed by the ſhocks of the earthquake, and its ruins after that conſumed by the fire. Many chaſms were opened in the ſides of the mountain; and from thoſe iſſued fire and burning ſtones, which darted up into the air with a noiſe like that produced by a ſmart diſcharge of artillery. Francis Negro de Piazza, a celebrated phyſician, who lived at Lentini, wiſhing to have a nearer view of the eruptions, and to make ſome obſervations which he thought might be of conſequence, was carried off and burnt to aſhes by a volley of the burning ſtones. This conflagration of Etna laſted ſome weeks.

22. In leſs than a year, on the 17th of April 1537, the river Simeto ſwelled ſo amazingly as to overflow the adjacent plains, and carry off the country people and their cattle and other animals. At the ſame time, the country around Paterno, the neighbouring caſtles, and more than 500 houſes, were deſtroyed by the ravages of the river; and moſt of the wood was torn up by the roots by violent blaſts of wind. Theſe ravages of the elements were occaſioned by Etna, which on the 11th of the following month was rent in ſeveral places, diſcloſing fiery gulphs, and pouring out a deluge of fire in more terrible torrents than thoſe of the preceding year. They directed their courſe towards the monaſtery of St Nicholas d'Arena; deſtroyed the gardens and vineyards; and proceeding onwards towards Nicoloſi, burnt Montpellieri and Fallica, and deſtroyed the vineyards and moſt of the inhabitants. When the conflagration ceaſed, the ſummit of the mountain ſunk inwards with ſuch a noiſe, that all the people in the iſland believed the laſt day to be arrived, and prepared for their end by extreme unction. Theſe dreadful diſturbances continued through the whole year, more eſpecially in the months of July and Auguſt, during which all Sicily was in mourning. The ſmoke, the noiſe, and the ſhocks of the earthquake, affected the whole iſland; and if Filotes may be believed, who relates this event, many of the Sicilians were ſtruck deaf by the noiſe. Many ſtructures were demoliſhed; and among others the caſtle of Corleone, though more than 25 leagues diſtant from the volcano. Etna.

23. During the ſucceeding 30 years there was no diſturbance of this nature. At the end of that ſpace, Sicily was alarmed by a new eruption from the mountain. Etna diſcharged new ſtreams of fire, and covered the adjacent country with volcanic aſhes, which entirely ruined the hopes of the huſbandman.

24. In the year 1579, Etna renewed its ravages; but no particular account of the damage which it did upon this occaſion has been tranſmitted to us.

25. Twenty-five years had elapſed, when Etna, in the month of June 1603, flamed with new fury. Peter Carrera affirms, that it continued to emit flames for the ſpace of 33 years, till 1636, without interruption, but not always with the ſame violence. In 1607, the ſtreams of lava which flowed from it deſtroyed the woods and vineyards on the weſt ſide of the mountain. In 1609, they turned their courſe towards Aderno, and deſtroyed a part of the foreſt del Pino, and a part of the wood called *la Sciambrita*, with many vineyards in the diſtrict Coſterna. Thoſe torrents of lava continued to flow for three months. In the year 1614, a new effort of the ſubterraneous fire opened another crater, from which fire was diſcharged on Randazzo, in the diſtrict called *il Piro*. The fire continued to flame for 10 or 12 years longer.

26. The ſame Peter Carrera relates, that a dreadful conflagration happened in the year 1664, of which he himſelf was witneſs. It happened on the 13th of December, and laſted without interruption, but with different degrees of violence, till the end of May 1678. But in 1669 the inhabitants of Nicoloſi were obliged to forſake their houſes, which tumbled down ſoon after they left them. The crater on the ſummit of Etna had not at this time a threatening aſpect, and every thing there continued quiet till the 25th of March: but on the 8th of that month, an hour before night, the air was obſerved to become dark over the village la Pedara and all that neighbourhood; and the inhabitants of that country thought that an almoſt total eclipſe was taking place. Soon after ſun-

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Etna. ſet, frequent ſhocks of earthquake began to be felt; theſe were at firſt weak, but continued till day-break to become more and more terrible. Nicoloſi was more affected than any other tract of country on that ſide of Etna: about noon every houſe was thrown to the ground; the inhabitants fled in conſternation, and invoking the protection of heaven. On the 10th of March a chaſm ſeveral miles in length, and five or ſix feet wide, opened in the ſide of the mountain; from which, about two hours before day, there aroſe a bright light, and a very ſtrong ſulphureous exhalation was diffuſed through the atmoſphere.

About 11 in the forenoon of the ſame day, after dreadful ſhocks of earthquake, a crater was opened on the hill called *des Noiſettes*, from which there iſſued huge volumes of ſmoke, not accompanied with fire, aſhes, or ſtones, but with loud and frequent claps of thunder, diſplaying all the different phenomena with which thunder is at different times attended. And what was very remarkable, the chaſm was formed on the ſouth ſide, between the top and the bottom of the mountain. On the ſame day another chaſm was formed two miles lower, from which iſſued a great deal of ſmoke, accompanied with a dreadful noiſe and earthquake. Towards the evening of the ſame day, four other chaſms were opened towards the ſouth, in the ſame direction, accompanied during their formation with the ſame phenomena, and extending all the way to the hill called *la Fuſara*.

About 12 paces beyond that, another of the ſame kind was formed. On the ſucceeding night, a black ſmoke, involving a quantity of ſtones, iſſued from this laſt chaſm; it diſcharged at the ſame time flakes of a dark earth-coloured ſpongy matter, which became hard after they fell. There iſſued from the ſame gulph a ſtream of lava, which held its courſe into a lake called *la Hardia*, ſix miles from Montpellieri, and on its way thither deſtroyed many dwelling-houſes and other buildings in the neighbouring villages.

On the next day, March 12th, this ſtream of fire directed its courſe towards the tract of country called *Malpaſſo*, which was inhabited by 800 people: in the ſpace of 20 hours it was entirely depopulated and laid waſte. The lava then took a new direction, in which it deſtroyed ſome other villages.

The mount of Montpellieri was next deſtroyed with all the inhabitants upon it.

On the 23d of the ſame month the ſtream of fire was in ſome places two miles broad. It now attacked the large village of Mazzalucia; and on the ſame day a vaſt gulph was formed, from which were diſcharged ſand or aſhes, which produced a hill with two ſummits, two miles in circumference and 150 paces high. It was obſerved to conſiſt of yellow, white, black, grey, red, and green, ſtones.

The new mount of Nicoloſi continued to emit aſhes for the ſpace of three months; and the quantity diſcharged was ſo great as to cover all the adjoining tract of country for the ſpace of 15 miles: ſome of thoſe aſhes were conveyed by the winds as far as Meſſina and Calabria; and a north wind ariſing, covered all the ſouthern country about Agoſta, Lentini, and even beyond that, in the ſame manner.

While at that height on Nicoloſi ſo many extraordinary appearances were paſſing, the higheſt crater on the ſummit of Etna ſtill preſerved its uſual tranquillity. Etna.

On the 25th of March, about one in the morning, the whole mountain, even to the moſt elevated peak, was agitated by a moſt violent earthquake. The higheſt crater of Etna, which was one of the loftieſt parts of the mountain, then ſunk into the volcanic focus; and in the place which it had occupied, there now appeared nothing but a wide gulph more than a mile in extent, from which there iſſued enormous maſſes of ſmoke, aſhes, and ſtones. At that period, according to the hiſtorian of this event, the famous block of lava on mount Frumento was diſcharged from the volcanic focus.

In a ſhort time after, the torrent of fire, which ſtill continued to flow, directed its courſe towards Catania with redoubled noiſe, and accompanied with a much greater quantity of aſhes and burning ſtones than before. For ſeveral months many moſt alarming ſhocks of earthquake were felt; and the city was threatened with deſtruction by the torrent of fire. They in vain attempted to turn or divert its courſe; the lava roſe over the walls, and entered by an angle near the Benedictine convent on the 11th of June following. This awful event is related by Francis Monaco, Charles Mancius, Vincent Auria, and Thomas Thedeſchi.

27. Some years after this conflagration, a new burning gulph opened in the month of December 1682 on the ſummit of the mountain, and ſpread its lava over the hill of Mazarra.

28. On the 24th of May 1686, about ten in the evening, a new eruption burſt out from the ſummit of the mountain, on the ſide contiguous to the hill del Bue. Such a quantity of inflamed matter was thrown out as conſumed woods, vineyards, and crops of grain for four leagues round. It ſtopped its courſe in a large valley near the caſtle of Maſcali. Several people from the neighbourhood had aſcended a hill between the wood of Catania and the confines of Cirrita to obſerve the progreſs of the lava: but the hill, on a ſudden, ſunk inwards, and they were buried alive.

29. Etna was now long quiet; for no leſs a ſpace of time indeed than one half of the preſent age. In the year 1755 its eruptions were renewed. It opened near mount Lepra, and emitted as uſual fire and ſmoke; after which it remained quiet only for eight years.

30. In the year 1763, there was an eruption which continued three months, but with intervals. Etna was at firſt heard to rebellow. Flames and clouds of ſmoke were ſeen to iſſue out, ſometimes ſilver-coloured, and at other times, when the rays of the ſun fell upon them, of a purple radiance: at length they were carried off by the winds, and rained, as they were driven before them, a ſhower of fire all the way to Catania and beyond it. An eruption ſoon burſt out; the principal torrent divided into two branches, one of which ran towards the eaſt, and fell into a deep and extenſive valley.

The flames which iſſued from this new crater afforded a noble ſpectacle. A pyramid of fire was ſeen to riſe to a prodigious height in the air, like a beautiful artificial fire-work, with a conſtant and formidable battery, which ſhook the earth under thoſe who were ſpectators of the ſcene. Torrents of melted matter running

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Etna, Etolia.

running down the sides of the mountain, diffused a light bright as day through the darkness of night.

At sun-rising the burning lava was observed to have run round some oaks that were still standing unburnt. Their leaves were all withered. Some birds had fallen from their branches, and been burnt to death. Some people cast wood upon the lava, and it was immediately burnt. This lava continued hot, and exhaled smoke for two years. For five years after this, no snow appeared on the summit of Etna.

31. In the year 1764 a new crater was opened at a great distance from mount Etna.

32. In the year 1766 another was opened at the grotto of Paterno: fire, smoke, and an inconsiderable torrent of lava issued out of it.

33. On the 27th of January 1780 a new opening was formed two miles under the last mentioned crater. On the 28th of February, and the 14th of March, the earthquake was renewed on the north side, and accompanied with terrible noises.

Between the 6th of April and the 7th of May the convulsions were again renewed, accompained with noise as before; a quantity of pumice-stones and fine sand was discharged from it.

On the 18th of May the shocks were renewed: on the 23d a new crater was formed on the side of mount Frumento on the summit of Etna; and from it a torrent of lava discharged, which spread through the valley of Laudunza. It was 200 paces in breadth. Two other chinks were opened in the mountain near Paterno, and very near one another. The lava issuing from them proceeded in the space of seven days six miles; on the 25th it had run nine miles.

A new crater was likewise opened on the 25th; from which a quantity of red-hot stones continued to issue for half an hour, and fell at a very great distance: there proceeded likewise from it a stream of lava; which, in the same space of time, ran over a tract of country two miles in extent.

Several parts of those streams of lava were observed to be cool on the surface; and formed into solid masses, but melted again by a new stream of burning lava, which however did not melt the old lava.

34. The last eruption of Etna happened in 1787, as described in the former article ÆTNA, p. 222, 223.

ETOLIA, a country of ancient Greece, comprehending all that tract now called the *Despotat*, or *Little Greece*. It was parted on the east by the river Evenus, now the Fidari, from the Locrenses Ozolæ; on the west, from Acarnania by the Achelous; on the north, it bordered on the country of the Dorians and part of Epirus; and, on the south, extended to the bay of Corinth.

The Etolians were a restless and turbulent people; seldom at peace among themselves, and ever at war with their neighbours; utter strangers to all sense of friendship or principles of honour; ready to betray their friends upon the least prospect of reaping any advantage from their treachery: in short, they were looked upon by the other states of Greece no otherwise than as outlaws and public robbers. On the other hand, they were bold and enterprising in war; inured to labour and hardships; undaunted in the greatest dangers; jealous defenders of their liberties, for which they were, on all occasions, willing to venture their lives, and sacrifice all that was most dear to them. They distinguished themselves above all the other nations of Greece, in opposing the ambitious designs of the Macedonian princes; who, after having reduced most of the other states, were forced to grant them a peace upon very honourable terms. The constitution of the Etolian republic was copied from that of the Achæans, and with a view to form, as it were, a counter alliance; for the Etolians bore an irreconcileable hatred to the Achæans, and had conceived no small jealousy at the growing power of that state. The Cleomenic war, and that of the allies, called the *social war*, were kindled by the Etolians in the heart of Peloponnesus, with no other view but to humble their antagonists the Achæans. In the latter, they held out, with the assistance only of the Eleans and Lacedemonians, for the space of three years, against the united forces of Achaia and Macedon; but were obliged at last to purchase a peace, by yielding up to Philip all Acarnania. As they parted with this province much against their will, they watched all opportunities of wresting it again out of the Macedonian's hands; for which reason they entered into an alliance with Rome against him, and proved of great service to the Romans in their war with him: but growing insolent upon account of their services, they made war upon the Romans themselves. By that warlike nation they were overcome, and granted a peace on the following severe terms: 1. The majesty of the Roman people shall be revered in all Etolia. 2. Etolia shall not suffer the armies of such as are at war with Rome to pass through her territories, and the enemies of Rome shall be likewise the enemies of Etolia. 3. She shall, in the space of 100 days, put into the hands of the magistrates of Corcyra all the prisoners and deserters she has, whether of the Romans or their allies, except such as have been taken twice, or during her alliance with Rome. 4. The Etolians shall pay down in ready money, to the Roman general in Etolia, 200 Euboic talents, of the same value as the Athenian talents, and engage to pay 50 talents more within the six years following. 5. They shall put into the hands of the consul 40 such hostages as he shall choose; none of whom shall be under 12, or above 40 years of age: the prætor, the general of the horse, and such as have been already hostages at Rome, are excepted out of this number. 6. Etolia shall renounce all pretensions to the cities and territories which the Romans have conquered, though those cities and territories had formerly belonged to the Etolians. 7. The city of Oenis, and its district, shall be subject to the Acarnanians.

Etolia

After the conquest of Macedon by Paulus Æmilius, they were reduced to a much worse condition; for not only those among them, who had openly declared for Perseus, but such as were only suspected to have favoured him in their hearts, were sent to Rome, in order to clear themselves before the senate. There they were detained, and never afterwards suffered to return into their native country. Five hundred and fifty of the chief men of the nation were barbarously assassinated by the partisans of Rome, for no other crime but that of being suspected to wish well to Perseus. The Etolians appeared before Paulus Æmilius in mourning habits, and made loud complaints of such

inhuman

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Etolia || Etymology

inhuman treatment; but could obtain no redreſs: nay, ten commiſſioners, who had been ſent by the ſenate to ſettle the affairs of Greece, enacted a decree, declaring, that thoſe who were killed had ſuffered juſtly, ſince it appeared to them that they had favoured the Macedonian party. From this time thoſe only were raiſed to the chief honours and employments in the Etolian republic who were known to prefer the intereſt of Rome to that of their country; and as theſe alone were countenanced at Rome, all the magiſtrates of Etolia were the creatures and mere tools of the Roman ſenate. In this ſtate of ſervile ſubjection they continued till the deſtruction of Corinth, and the diſſolution of the Achæan league; when Etolia, with the other free ſtates of Greece, was reduced to a Roman province, commonly called the *province of Achaia*. Nevertheleſs, each ſtate and city was governed by its own laws, under the ſuperintendency of the pretor whom Rome ſent annually into Achaia. The whole nation paid a certain tribute, and the rich were forbidden to poſſeſs lands any where but in their own country.

In this ſtate, with little alteration, Etolia continued under the emperors, till the reign of Conſtantine the Great, who, in his new partition of the provinces of the empire, divided the weſtern parts of Greece from the reſt, calling them *New Epirus*, and ſubjecting the whole country to the *præfectus prætorii* for Illyricum. Under the ſucceſſors of Conſtantine, Greece was parcelled out into ſeveral principalities, eſpecially after the taking of Conſtantinople by the Weſtern princes. At that time, Theodorus Angelus, a noble Grecian, of the Imperial family, ſeized on Etolia and Epirus. The former he left to Michael his ſon; who maintained it againſt Michael Palæologus, the firſt emperor of the Greeks, after the expulſion of the Latins. Charles, the laſt prince of this family, dying in 1430 without lawful iſſue, bequeathed Etolia to his brother's ſon, named alſo *Charles*; and Acarnania to his natural ſons, Memnon, Turnus, and Hercules. But, great diſputes ariſing about this diviſion, Amurath II. after the reduction of Theſſalonica, laid hold of ſo favourable an opportunity, and drove them all out in 1432. The Mahometans were afterwards diſpoſſeſſed of this country by the famous prince of Epirus, George Caſtriot, commonly called *Scanderbeg*; who, with a ſmall army, oppoſed the whole power of the Ottoman empire, and defeated thoſe barbarians in 22 pitched battles. That hero, at his death, left great part of Etolia to the Venetians; but, they not being able to make head againſt ſuch a mighty power, the whole country was ſoon reduced by Mohammed II. whoſe ſucceſſors hold it to this day.

ETRURIA. See HETRURIA.

ETYMOLOGY, that part of grammar which conſiders and explains the origin and derivation of words, in order to arrive at their firſt and primary ſignification, whence Quintilian calls it *originatio*.—The word is formed of the Greek ἔτυμος *verus*, "true," and λέγω *dico*, "I ſpeak;" whence λογία *diſcourſe*, &c. and thence Cicero calls the etymology *notatio* and *veriloquium*; though Quintilian chooſes rather to call it *originatio*.

A judicious inquiry into etymologies is thought by ſome of conſiderable uſe; becauſe nations, who value themſelves upon their antiquity, have always looked on the antiquity of their language as one of the beſt titles they could plead; and the etymologiſt, by ſeeking the true and original reaſon of the notions and ideas fixed to each word and expreſſion, may often furniſh an argument of antiquity, from the traces remaining thereof, compared with the ancient uſes. Add, that etymologies are neceſſary for the thorough underſtanding of a language. For, to explain a term preciſely, there ſeems a neceſſity for recurring to its firſt impoſition, in order to ſpeak juſtly and ſatisfactorily thereof. The force and extent of a word is generally better conceived when a perſon knows its origin and etymology. Etymology || Evander.

It is objected, however, that the art is arbitrary, and built altogether on conjectures and appearances; and the etymologiſts are charged with deriving their words from where they pleaſe. And indeed it is no eaſy matter to go back into the ancient Britiſh and Gauliſh ages, and to follow, as it were, by the track, the various imperceptible alterations a language has undergone from age to age; and as thoſe alterations have ſometimes been merely owing to caprice, it is eaſy to take a mere imagination or conjecture for a regular analogy: ſo that it is no wonder the public ſhould be prejudiced againſt a ſcience which ſeems to ſtand on ſo precarious a footing. It muſt certainly be owned, that etymologies are frequently ſo far fetched, that one can ſcarce ſee any reſemblance or correſpondence therein. Quintilian has ſhown, that the ancient etymologiſts, notwithſtanding all their learning, fell into very ridiculous derivations.

The etymologies of our Engliſh words have been derived from the Saxon, Welch, Walloon, Daniſh, Latin, Greek, &c.

In the preſent work the etymologies of terms are generally noted, where their obviouſneſs does not render it unneceſſary, or their dubiety or unimportance uſeleſs.

EVACUANTS, in pharmacy, are properly ſuch medicines as diminiſh the animal fluids, by throwing out ſome morbid or redundant humour; or ſuch as thin, attenuate, and promote the motion and circulation thereof.

EVACUATION, in medicine, the art of diminiſhing, emptying, or attenuating, the humours of the body.

EVAGRIUS SCHOLASTICUS, a famous hiſtorian, born at Epiphania, about the year 536. He practiſed the profeſſion of an advocate, from which he was called *Scholaſticus*, which name was then given to the pleaders at the bar. He was alſo tribune and keeper of the prefect's diſpatches. He wrote an eccleſiaſtical hiſtory, which begins where Socrates and Theodoret ended theirs; and other works, for which he was rewarded by the emperors Tiberius and Mauricius. M. de Valois publiſhed at Paris a good edition of Evagrius's eccleſiaſtical hiſtory, in folio; and it was republiſhed at Cambridge in 1620, in folio, by William Reading, with additional notes of various authors.

EVANDER, a famous Arcadian chief, called the ſon of mercury, on account of his eloquence, brought a colony of his people into Italy, about 60 years before the taking of Troy; when Faunus, who then reigned over the Aborigenes, gave him a large extent of country, in which he ſettled with his friends. He is ſaid to have taught the Latins the uſe of letters, and the art of huſbandry. He kindly received Hercules

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Evangeliſts || Evaporation.

when he returned from the conqueſt of Geryon, and he was the firſt who raiſed him altars. He gave Æneas aſſiſtance againſt the Rutuli, and diſtinguiſhed himſelf by his hoſpitality. It is ſaid that he firſt brought the Greek alphabet into Italy, and introduced there the worſhip of the Greek deities. He was honoured as a God after death, and his ſubjects raiſed him an altar on mount Aventine.

EVANGELISTS, the inſpired authors of the goſpels. The word is derived from the Greek ευαγγελιον, formed of ευ *bene*, "well," and αγγελος "angel or meſſenger."

The denomination *evangeliſts* was likewiſe given in the ancient church to ſuch as preached the goſpel up and down, without being attached to any particular church, being either commiſſioned by the apoſtles to inſtruct the nations, or of their own accord abandoning every worldly attachment and conſecrating themſelves to the ſacred office of preaching the goſpel. In which ſenſe ſome interpreters think it is that St Philip, who was one of the ſeven deacons, is called the *evangeliſt*, in the 21ſt chapter of the Acts of the Apoſtles, ver. 8. Again, St Paul writing to Timothy, Ep. ii. cap. iv. ver. 5. bids him do the work of an evangeliſt. The ſame apoſtle, Eph. iv. 11. ranks the evangeliſts after the apoſtles and prophets.

EVANID, a name given by ſome authors to ſuch colours as are of no long duration, as thoſe in the rainbow, in clouds before and after ſun-ſet, &c.

Evanid colours are alſo called *fantaſtical* and *emphatical* colours.

EVANTES, in antiquity, the prieſteſſes of Bacchus, thus called, becauſe in celebrating the orgia they ran about as if diſtracted, crying, *Evan, evan, ohé evan.* See BACCHANALIA.

EVAPORATION, in natural philoſophy, ſignifies the converſion of fluids, principally water, into vapour, ſo that it becomes ſpecifically lighter than the atmoſphere.

The theory of evaporation, and formation of vapour by the abſorption of heat, is fully diſcuſſed under the article CHEMISTRY; it remains only therefore to take notice of ſome of the moſt remarkable phenomena attending it. With regard to water, it is generally allowed that it evaporates in every degree of heat above 32° to 212°, which is its boiling point, when it is diſſipated in great quantity, and as faſt as poſſible. It has alſo been ſuppoſed to evaporate even after its converſion into ice; but ſome late authors have denied this to be the caſe. Other liquids, ſuch as ſpirit of wine or ether, continue to evaporate long after they have been cooled down to the freezing point of water; nor is there any experiment by which it has yet been diſcovered at what degree their evaporation ceaſes. Even quickſilver, to appearance a much more heavy and ſluggiſh fluid, and which does not boil without applying almoſt three times the heat neceſſary to make water boil, is found readily to evaporate when the preſſure of the atmoſphere is taken off; and hence the empty parts of barometrical tubes, where the inſtruments were made with great accuracy and the tubes perfectly exhauſted, have been covered with mercurial globules, owing to an inviſible vapour aſcending from the ſurface of the metal. In like manner the evaporation of water is very ſenſible in ſome experiments with the air-pump. Dr Prieſtley found, that where moiſture was carefully excluded from his apparatus, he was never able to produce ſuch a quantity of inflammable air by heating charcoal as when a little quantity of water was admitted by moiſtening the leather on which the receiver ſtood. Nor is the elaſticity of this kind of ſteam altogether imperceptible; for in the barometer above mentioned, the accuracy of the inſtrument was conſiderably affected by the ſteam of the mercury aſcending from it, and occupying the void ſpace in the upper part of the glaſs tube. Evaporation.

Evaporation, according to the experiments of the Abbé Nollet, appears to be promoted by electricity. The concluſions drawn from them are, 1. Electricity augments the natural evaporation of fluids; all that were tried, excepting mercury and oil, being found to ſuffer a conſiderable diminution, greater than what could be aſcribed to any other cauſe. 2. Electricity augments the evaporation of thoſe fluids the moſt which are found moſt readily to evaporate ſpontaneouſly; the volatile ſpirit of ſal-ammoniac ſuffering a greater loſs than ſpirit of wine or oil of turpentine, theſe two more than common water, and water more than vinegar or a ſolution of nitre. 3. The effects ſeemed always to be greateſt when the veſſels containing the fluids were non-electrics. 4. The increaſed evaporation was more conſiderable when the veſſel which contained the liquor was more open; but the effects did not increaſe in proportion to the apertures. 5. Electricity was alſo found to increaſe the evaporation from ſolid bodies, and of conſequence to augment the inſenſible perſpiration of animals.

1 Evaporation promoted by electricity.

Evaporation is one of the great natural proceſſes, and by means of it the whole vegetable kingdom is ſupplied with rain neceſſary for its ſupport. This evaporation takes place at all times, not only from the ſurface of the ocean, but of the earth alſo. Dr Halley, by an experiment with a pan of water kept in the heat of our ſummer ſun, found, that as much water might be reaſonably ſuppoſed to evaporate from the ſurface of the Mediterranean ſea, as would be ſufficient to ſupply all the rivers which run into it. Dr Watſon in his Chemical Eſſays, has ſhown, that the evaporation is not leſs conſiderable from the ſurface of the land than from that of the ſea. By inverting a glaſs veſſel on the ground, in the time of a conſiderable drought, he found that even then about 1600 gallons of water were raiſed from an acre in 24 hours; and repeating the experiment after a thunder-ſhower, he found that in ſuch a ſtate an acre parted with above 1900 gallons of water in 12 hours.

2 Great quantity of water evaporated naturally from the earth and ſea.

This evaporation is carried on not only from the ground itſelf, but from the leaves of trees, graſs, &c. with which it is covered; and great part of the water thus raiſed falls down again in the night-time in dew, being abſorbed by the ſame vegetables which yielded it before. Thus the earth is not ſo ſoon exhauſted of water, even for a little way below the ſurface, as we might be apt to imagine from the quantity raiſed by evaporation: for if all that was raiſed by the ſun's heat during the time of a long drought, left the earth not to return to it for perhaps five or ſix weeks, the whole vegetable kingdom, at leaſt ſuch as do not ſtrike their roots very deeply into the ground, muſt of neceſſity be deſtroyed; which yet we ſee is only the caſe with the moſt tender graſs, and even that only

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Evaporation.

only on the moſt elevated ſituations, and when moſt expoſed to the ſun.

3 Cold produced by evaporation.

Another great uſe of the natural evaporation is to cool the earth, and prevent its being too much heated by the ſun. This property of producing cold by evaporation has been but lately obſerved by chemiſts, though it has long been employed by thoſe who knew not the reaſon of their doing ſo. It has been obſerved at Aleppo in Syria, that the water in their jars is always the cooleſt when the weather is moſt warm and the power of the ſun exceſſive. The heats in that part of the world are ſometimes almoſt intolerable; and at that time the evaporation from the outſide of the jars, which are made of porous clay, is very copious; and in proportion to the quantity of water evaporated from without, is the degree of cold in the liquor within. The reaſon of this is eaſily deduced from what is ſaid under the article CHEMISTRY; where it is ſhown that vapour is compoſed of fire and water united together. The conſequence of this is, that wherever there is any quantity of latent heat above 32° of Fahrenheit contained in any body, the water in contact with the ſurface, or contained in the pores of the body, will gradually abſorb it, and converting it into latent heat, will thus be rendered ſpecifically lighter than the common atmoſphere, and fly off into it. Thus part of the ſenſible heat of the body will be carried off; and as ſubſequent quantities of water always fly off with more and more of the ſenſible heat, it is plain, that by continued evaporation of water almoſt all the ſenſible heat above 32° of Fahrenheit will be carried off. If inſtead of water, ſpirit of wine be made uſe of, which continues to evaporate long after it is cooled to 32°, a much greater degree of cold may be produced than by the evaporation of mere water; and if inſtead of ſpirit of wine, we make uſe of ether, which is ſtill more volatile than ſpirit of wine, an exceſſive degree of cold, ſcarcely inferior to that which congeals mercury, may be produced.

This method of producing cold by means of the expenſive liquids of ether and ſpirit of wine, cannot be employed excepting merely for the ſake of experiment: but that by the evaporation of water may be applied to very uſeful purpoſes in the warm countries; and it has been cuſtomary with ſailors to cool their caſks of liquors by ſprinkling them with ſea water.

4 Effects of evaporation on the human body.

From the theory of evaporation laid down under the article CHEMISTRY, we may eaſily ſee the reaſon why, in a very warm temperature, animal bodies have the power of producing cold. A vapour, called inſenſible perſpiration, continually iſſues from the bodies of animals, from human bodies eſpecially, which, carrying off great quantities of their ſenſible heat, enables them, according to its quantity, to preſerve the ſame temperature in many different degrees of atmoſpherical heat.

For the ſame reaſon alſo we may ſee why the continual ſprinkling with cold water is ſo very powerful in depriving the human body of the heat neceſſary for the ſupport of life, even though the temperature of the water ſhould not be below what can be eaſily borne. It has already been ſhown, that by the evaporation of water, a degree of cold not much inferior to that of freezing water may be produced; and conſequently, by continual ſprinkling of the body with water, the whole might in time be reduced to nearly the degree of cold in which water freezes. But this is what no human body can bear: and hence we may underſtand why ſtorms of rain and ſnow are often fatal; and likewiſe why, in caſes of ſhipwreck, people have died by being expoſed for a few hours to the ſpray of the ſea.

Evaporation.

5 Curious phenomenon with regard to melting ice.

The theory of the evaporation of water laid down under the article CHEMISTRY, furniſhes us alſo with a ſolution of a very curious phenomenon, inexplicable on any other principle, viz. why melting ice will freeze other pieces together more ſtrongly; and, if a conſiderable degree of heat is not continued for ſome time, will again conſolidate itſelf into a much harder maſs than before. The fact was diſcovered by Mr Wedgewood in an attempt to connect his clay thermometer with the common mercurial ones. In this attempt he had occaſion to repeat an experiment made by Meſſrs Lavoiſier and de la Place, who had meaſured the heat of bodies by the quantity of ice they are capable of liquefying. Theſe authors obſerve, that if ice, cooled to any degree below the freezing point, be expoſed to a warmer atmoſphere, it will be brought up to the freezing point through its whole maſs before any part of it begins to liquefy; and that conſequently ice, beginning to melt on the ſurface, will be always exactly at the ſame temperature, viz. at the freezing point; and that if a heated body be incloſed in a hollow ſphere of ſuch ice, the whole of its heat will be occupied in melting it: ſo that if the ice be defended from external warmth, by ſurrounding it with other ice in a proper veſſel, the weight of the water produced from it will be exactly proportional to the heat which the heated body has loſt; or, in other words, will be a true phyſical meaſure of the heat. For the experiment, they provide a tin veſſel divided by upright concentric partitions into three compartments, one within another. The innermoſt compartment is a wire-cage for receiving the heated body; the ſecond, ſurrounding this cage, is filled with pounded ice, to be melted by the heat; and the outermoſt is filled alſo with pounded ice, to defend the former from the warmth of the atmoſphere. The firſt of theſe ice compartments terminates at bottom in a ſtem like a funnel, through which the water is conveyed off; and the other ice compartment terminates in a ſeparate canal for diſcharging the water into that ice which is reduced. As ſoon as the heated body is dropped into the cage, a cover is put on, which goes over both that and the firſt ice compartment; which cover is itſelf a kind of ſhallow veſſel filled with pounded ice, with holes in the bottom for permitting the water to paſs from this ice into the ſecond compartment; all the liquefaction that happens in both being only the effect of the heated body. Another cover, with pounded ice, is placed over the whole as a defence from external warmth.

Mr Wedgewood began by ſatisfying himſelf that ice did really acquire the temperature of 32° throughout its whole ſubſtance before it began to melt; but being apprehenſive that the pounded ice might imbibe and retain ſome water amongſt it by capillary attraction, he judged it neceſſary to attend to this circumſtance alſo. Having therefore pounded ſome ice, he laid it in a conical heap on a plate; and having at hand ſome water coloured with cochineal, he poured it gently into the plate at ſome diſtance from the heap. It roſe haſtily to the top, and was retained by the maſs as by

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a ſponge; nor did any part of it begin to drop till the heat of his hand began to liquefy the maſs. He farther obſerved, that in a conical heap of this kind the water roſe two inches and a half in the ſpace of three minutes; and by weighing the water employed, and what remained upon the plate unabſorbed, it appeared that four ounces of ice had taken up and retained one ounce of water. To aſcertain this abſorbing power of ice more fully, he preſſed ſix ounces of it into a funnel, having firſt introduced a wooden core, in order to leave a proper cavity in the middle; then taking out the core, and pouring an ounce of water on the ice, he left the whole for half an hour, during which time there ran out only 12 pennyweights and four grains; ſo that the ice had retained ſeven pennyweights and 20 grains; nearly one-twelfth of its own weight, and two-fifths of the weight of the water.

Being now convinced that it would be proper to uſe ſolid ice inſtead of that which was pounded, he determined to congeal a quantity of water into one maſs by a freezing mixture, and then expoſe it to the atmoſphere till it began to liquefy. His apparatus for this purpoſe is repreſented Plate CLXXXIX. *A* is a large funnel filled with a ſolid maſs of ice. *B*, a cavity in the middle of this ice, formed part of the way by ſcraping with a knife, and for the remaining part by boring with a hot iron wire. *C*, one of the thermometer pieces, ſerves for the heated body, and reſts on a coil of braſs-wire: it had been previouſly burnt with a ſtrong fire, that there might be no danger of its ſuffering any farther diminution of bulk by being heated again for thoſe experiments. *D*, a cork ſtopped in the orifice of the funnel. *E*, the exterior veſſel, having the ſpace between the ſides and its included funnel *A* filled with pounded ice as a defence to the ice in the funnel. *F*, a cover for this exterior veſſel, filled with pounded ice for the ſame purpoſe. *G*, a cover for the funnel, filled alſo with pounded ice, with perforations in the bottom for allowing the water to paſs from this ice down to the funnel. The thermometer piece was heated in boiling water, taken up with a ſmall pair of tongs equally heated, dropped inſtantly into the cavity *B*, and the covers put on as expeditiouſly as poſſible; the bottom of the funnel being previouſly corked, that the water might be detained till it ſhould part with all its heat, and likewiſe to prevent the water from the other ice, which ran down on the outſide of the funnel, from mingling with it. After ſtanding about 10 minutes the funnel was taken out, wiped dry, and uncorked over a weighed cup: the water that ran out weighed 22 grains. On repeating the experiment the water weighed only 12 grains; and on a third trial, in which the piece was continued much longer in the cavity, the liquid did not amount to three drops. To his ſurpriſe Mr Wedgewood alſo now found the piece frozen to the ice ſo that it could not eaſily be got off, though all the ice was at the beginning of the experiment in a thawing ſtate.

On heating the piece again to 6° of his thermometer (1857 of Fahrenheit), and throwing ſome fragments of ice over it, he found that in about half an hour the water amounted to 11 pennyweights. On ſtopping the funnel, replacing the covers, and leaving the whole about ſeven hours, he found, that a conſiderable quantity of water was collected; but it ran out ſo ſlowly, that he imagined ſomething had ſtopped the narrow end of the funnel: but on examining the ſtate of the ice, he found that the fragments he had thrown over the thermometer-piece were entirely frozen together, and in ſuch a form that it was evident they could not have aſſumed it without freſh water having been ſuperadded and thrown upon them, the cavities between them being partly filled with new ice. This was ſo ſtrongly cemented, that he could ſcarcely get it out with the point of a knife, and great part of the coiled wire was found enveloped in the new ice. The paſſage through the ice to the ſtem of the funnel, which had been made pretty wide with a thick iron wire, was ſo nearly ſhut up, that the ſlow draining of the water was now very eaſily accounted for; this draining of the water indeed being the only ſign of any paſſage at all. On taking the ice out of the funnel, and breaking it to examine this canal, he found it almoſt entirely filled up with ice projecting from the ſolid maſs in cryſtalline forms, ſimilar in appearance to the cryſtals we often meet with in the cavities of flints and quartzoſe ſtones. A coating of ice was alſo found on the outſide of the funnel perfectly tranſparent, and of a conſiderable extent, about the $\frac{1}{10}$th of an inch thick: this coating enveloped alſo a part of the funnel which was not in contact with the ſurrounding ice, the latter being melted to the diſtance of an inch from it. Some of the ice being ſcraped off from the inſide of the funnel and applied to the bulb of the thermometer, the mercury ſunk from 50° to 32°, and continued at that point till the ice was melted; after which the water being poured off, it roſe in a little time to 47°.

Aſtoniſhed at theſe appearances, our author determined to repeat the experiment with ſome pieces of ice he had ſtored up in a cellar; but on going thither, he found the caſk of ice itſelf in a ſimilar ſituation to that made uſe of in his experiments. Though much of it was melted, yet the fragments were frozen together, ſo that it was with difficulty that any pieces could be broken or got out with an iron ſpade; and when ſo broken, it had the appearance of Breccia marble, or plum-pudding ſtone; the fragments having been broken and rammed into the caſk with an iron mall. A porcelain cup being laid upon ſome of this ice about half an hour, in a room whoſe temperature was 50°, it was found pretty firmly adhering; and when pulled off, the ice exhibited an exact impreſſion of the fluted part of the cup with which it had been in contact; ſo that the ice muſt neceſſarily have been liquefied firſt, and afterwards congealed. This was ſeveral times repeated with the ſame event. Fragments of the ice were likewiſe applied to one another, to ſponges, pieces of flannel, and linen cloth, both moiſt and dry: all theſe in a few ſeconds began to cohere; and in about a minute were frozen ſo as to require ſome force to ſeparate them. After ſtanding an hour, the cohefion was ſo firm, that on pulling away the fragments of ice from the woollen and ſponge, they tore off with them that part of the ſurface with which they were in contact; though at the ſame time both the ſponge and flannel were filled with water which that very ice had produced.

The power of the congelation was ſtronger on the ſponge and woollen than on linen; and to eſtimate its force, a piece of ice was applied to a bit of dry flannel weighing two pennyweights and an half, ſurrounding them at the ſame time with other ice. After lying together

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together three quarters of an hour, he found that a weight of five ounces was neceſſary to ſeparate them, though ſo much of the ice had liquefied that the weight of the flannel was increaſed by more than 14 pennyweights. The piece of ice was then weighed, put to the flannel a ſecond time, and left in contact with it for four hours; at the end of which time they were found ſo firmly frozen together, that 78 ounces were required for their ſeparation, although from 42 pennyweights of the ice 15 more had melted off: the ſurface of contact was at this time about a ſquare inch. Continuing them in contact for 7 hours longer, they only bore 62 ounces, the ice being diminiſhed to 14 pennyweights, and the ſurface of contact reduced to about $\frac{6}{10}$ths of an inch ſquare.

6 Water abſorbed by ſolid ice.

On trying whether maſſes of ice apparently ſolid would abſorb water, he found that they did ſo in conſiderable quantity; for on heating ſome of his thermometer pieces, and laying them on pieces of ice, in which they made conſiderable cavities, he always found the water abſorbed as faſt as it was produced, leaving both the piece and the cavity dry.

Thus was our author convinced, that, in his experiments, the two ſeemingly oppoſite proceſſes of nature, congelation and liquefaction, went on together at the ſame time, in the ſame veſſel, and even in the ſame piece of ice. To account for ſuch an extraordinary phenomenon, he had recourſe to two different theories.

7 Two different theories of this phenomenon.

One was, that water, when highly attenuated, and reſolved into vapour, may freeze with a leſs degree of cold than water in its aggregate or groſſer form: whence hoar froſt is obſerved on graſs, trees, &c. at times when there is no appearance of ice upon water, and when the thermometer is above the freezing point; which ſeems alſo to have been the opinion of Boerhaave, as he places the freezing of vapour, or even of water when divided by abſorption in a linen cloth, at 33°. "Now (ſays Mr Wedgewood), as the atmoſphere abounds with watery vapour, or water diſſolved and chemically combined, and muſt be particularly loaded with it in the neighbourhood of melting ice; as the heated body introduced into the funnel muſt neceſſarily convert a portion of the ice or water into vapour; and as ice is known to melt as ſoon as the heat begins to exceed 32°, or nearly one degree lower than the freezing point of vapour; I think we may from hence deduce pretty ſatisfactorily all the phenomena I have obſerved. For it naturally follows from theſe principles, that vapour may freeze where ice is melting; that the vapour may congeal, even upon the ſurface of melting ice itſelf; and that the heat which, according to the ingenious theory of Dr Black, it emits in freezing, may contribute to the further liquefaction of that very ice upon which the new congelation is formed.

"I would further obſerve, that the freezing of water is attended with plentiful evaporation in a cloſe as well as in an open veſſel; the vapour in the former condenſing into drops on the under ſide of the cover, which either continue in the form of water, or aſſume that of ice or a kind of ſnow, according to circumſtances; which evaporation may perhaps be attributed to the heat, that was combined with the water, at this moment rapidly making its eſcape, and carrying part of the aqueous fluid off with it. We are hence furniſhed with a freſh and continual ſource of vapour as well as heat: ſo that the proceſſes of liquefaction and congelation may go on uninterruptedly together, and even neceſſarily accompany one another; although, as the freezing muſt be in an under proportion to the melting, the whole of the ice muſt ultimately be conſumed. Evaporation.

"Some other circumſtances may be taken notice of in the coating of ice on the outſide of the throat of the funnel. Neither the cover of the outer veſſel, nor the aperture in its bottom which the ſtem of the funnel paſſed through, were air-tight; and the melting of the ſurrounding ice had left a vacancy about an inch round that part of the funnel on which the cruſt had formed. As there was therefore a paſſage for air through the veſſel, a circulation of it would probably take place; the cold and denſe air in the veſſel would deſcend into the rarer air of the room, then about 50°, and be replaced by air from above. The effect of this circulation and ſudden refrigeration of the air will be a condenſation of part of the moiſture it contains upon the bodies it is in contact with; the throat of the funnel being one of theſe bodies, muſt receive its ſhare; and the degree of cold in which the ice thaws being ſuppoſed ſufficient for the freezing of this moiſt vapour, the contact, condenſation, and freezing, may happen at the ſame inſtant. The ſame principles apply to every inſtance of condenſation that took place in theſe experiments; and the congelation was evidently ſtrongeſt in thoſe circumſtances where vapour was moſt abundant, and on thoſe bodies which from their natural or mechanic ſtructure were capacious of the greateſt quantity of it; ſtronger, for inſtance, on ſponge than on woollen, ſtronger on this than on the cloſer texture of linen, and far ſtronger on all of theſe than on the compact ſurface of porcelain."

The ſecond theory propoſed by our author for ſolving the phenomena in queſtion is founded entirely on the principles of evaporation. "If nevertheleſs (ſays he) the principle I have aſſumed, that water highly attenuated will congeal with a leſs degree of cold than water in the maſs, ſhould not be admitted; another has above been hinted at, which experiments have decidedly eſtabliſhed, from which the phenomena may perhaps be equally accounted for, and which, even though the other alſo is received, muſt be ſuppoſed to concur for ſome part of the effect: I mean, that evaporation produces cold; both vapour and ſteam carrying of ſome proportion of heat from the body which produces them. If therefore evaporation be made to take place upon the ſurface of ice, the contiguous ice will thereby be rendered colder; and as it is already at the freezing point, the ſmalleſt increaſe of cold will be ſufficient for freſh congelation. If ice is producible by evaporation in the Eaſt Indies *, where natural ice is never ſeen, we need not wonder that congelation ſhould take place where the ſame principle operates amidſt actual ice.

* See *Congelation.*

"It has been obſerved above, that the heat emitted by the congealing vapour probably unites with and liquefies contiguous portions of ice: but whether the whole, either of the heat ſo emitted, or of that originally introduced into the funnel, is thus taken up; how often it may unite with other portions of ice, and be driven out from other new congelations; whether there exiſts any difference in its chemical affinity or elective attraction to water in different ſtates and the

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Evaſion || Euchites.

contiguous bodies; whether part of it may not ultimately eſcape, without performing the office expected from it upon the ice; and to what diſtance from the evaporating ſurface the refrigerating power may extend; muſt be left for further experiments to determine."

EVASION, in law, is uſed for any ſubtile endeavour to ſet aſide truth, or to eſcape the puniſhment of the law, which will not be endured. Thus, if a perſon ſays to another that he will not ſtrike him, but will give him a pot of ale to ſtrike him firſt, and accordingly he ſtrikes, the returning of it is puniſhable; and if the perſon firſt ſtriking be killed, it is murder; for no man ſhall evade the juſtice of the law by ſuch a pretence to cover his malice.

EVATES, a branch or diviſion of the druids, or ancient Celtic philoſophers. Strabo divides the Britiſh and Gauliſh philoſophers into three ſects; bards, evates, and druids. He adds, that the bards were the poets and muſicians; the evates, the prieſts and naturaliſts; and the druids were moraliſts as well as naturaliſts: But Marcellus and Hornius reduce them all to two ſects, *viz.* the BARDS and DRUIDS.

EUBAGES, an order of prieſts or philoſophers among the ancient Celtæ or Gauls: ſome will have the eubages to be the ſame with the druids and ſaronidæ of Diodorus; and others, that they were the ſame with what Strabo calls EVATES.

EUBŒA (anc. geog.), an oblong iſland, ſtretching out between Attica and Theſſaly, oppoſite to Bœotia; from which it is ſeparated by a narrow ſtrait called *Euripus*. This iſland, never exceeding 40, nor ever falling ſhort of two miles in breadth, is in length 150 miles, and in compaſs 365, according to Pliny. Now NEGROPONT, from its principal town, which was anciently called *Chalcis*.

EUCHARIST, the ſacrament of the Lord's ſupper, properly ſignifies *giving thanks*.—The word in its original Greek, Ευχαριστια, literally imports *thankſgiving*; being formed of ευ, *bene*, "well," and χαρις, *gratia*, "thanks."

This ſacrament was inſtituted by Chriſt himſelf, and the participation of it is called *communion*.

As to the manner of celebrating the euchariſt among the ancient Chriſtians, after the cuſtomary oblations were made, the deacon brought water to the biſhops and preſbyters, ſtanding round the table, to waſh their hands; according to that of the pſalmiſt, "I will waſh my hands in innocency, and ſo will I compaſs thy altar, O Lord." Then the deacon cried out aloud, "Mutually embrace and kiſs each other;" which being done, the whole congregation prayed for the univerſal peace and welfare of the church, for the tranquillity and repoſe of the world, for the proſperity of the age, for wholeſome weather, and for all ranks and degrees of men. After this followed mutual ſalutations of the miniſter and people; and then the biſhop or preſbyter having ſanctified the elements by a ſolemn benediction, he brake the bread, and delivered it to the deacon, who diſtributed it to the communicants, and after that the cup. Their ſacramental wine was uſually diluted or mixed with water. During the time of adminiſtration, they ſang hymns and pſalms; and having concluded with prayer and thankſgiving, the people ſaluted each other with a kiſs of peace, and ſo the aſſembly broke up.

EUCHITES, or EUCHITÆ, a ſect of ancient heretics, who were firſt formed into a religious body towards the end of the fourth century, though their doctrine and diſcipline ſubſiſted in Syria, Egypt, and other eaſtern countries before the birth of Chriſt; they were thus called becauſe they prayed without ceaſing, imagining that prayer alone was ſufficient to ſave them. Their great foundation were thoſe words of St Paul, (Theſſalonians v. 17.), *Pray without ceaſing*. The word is formed of the Greek, ευχη *prayer*, whence ευχιται, the ſame with the Latin, *precatores*, "prayers." They were alſo called *Enthuſiaſts* and *Meſſalians*; a term of Hebrew origin, denoting the ſame as Euchites.

Euchites || Euclid.

The Euchites were a ſort of myſtics who imagined, according to the oriental notion, that two ſouls reſided in man, the one good and the other evil; and who were zealous in expelling the evil ſoul or dæmon, and haſtening the return of the good ſpirit of God, by contemplation, prayer, and ſinging of hymns. They alſo embraced the opinions nearly reſembling the Manichean doctrine, and which they derived from the tenets of the oriental philoſophy. The ſame denomination was uſed in the 12th century, to denote certain fanatics who infeſted the Greek and Eaſtern churches, and who were charged with believing a double Trinity, rejecting wedlock, abſtaining from fleſh, treating with contempt the ſacraments of baptiſm and the Lord's ſupper, and the various branches of external worſhip, and placing the eſſence of religion ſolely in external prayer, and maintaining the efficacy of perpetual ſupplications to the ſupreme Being for expelling an evil being or genius, which dwelt in the breaſt of every mortal. This ſect is ſaid to have been founded by a perſon called *Lucopetrus*, whoſe chief diſciple was named *Tychicus*. By degrees it became a general and invidious appellation for perſons of eminent piety and zeal for genuine Chriſtianity, who oppoſed the vicious practices and inſolent tyranny of the prieſthood; much in the ſame manner as the Latins comprehended all the adverſaries of the Roman pontiff under the general terms of WALDENSES and ALBIGENSES.

St Cyril of Alexandria, in one of his letters, takes occaſion to cenſure ſeveral monks in Egypt, who, under pretence of reſigning themſelves wholly to prayer, led a lazy, ſcandalous life. A cenſure likewiſe applicable to monaſteries in general.

EUCHOLOGIUM, Ευχολογιον, a Greek term, ſignifying literally *a diſcourſe on prayer*. The word is formed of ευχη *prayer*, and λογος *diſcourſe*.

The Euchologium is properly the Greek ritual, wherein are preſcribed the order and manner of every thing relating to the order and adminiſtration of their ceremonies, ſacraments, ordinations, &c.

F. Goar has given us an edition of the Greek Euchologium in Greek and Latin, with notes, at Paris.

EUCLID *of* MEGARA, a celebrated philoſopher and logician, flouriſhed about 400 B. C. The Athenians having prohibited the Megarians from entering their city on pain of death, this philoſopher diſguiſed himſelf in womens clothes to attend the lectures of Socrates. After the death of Socrates, Plato and other philoſophers went to Euclid at Megara, to ſhelter themſelves from the tyrants who governed Athens. Euclid admitted but one chief good; which he ſometimes called *God*, ſometimes *Spirit*, and ſometimes *Providence*.

EUCLID *of Alexandria*, the celebrated mathemati-

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Eucrasy, Eudiometer.

cian, flouriſhed in the reign of Ptolemy Lagus, about 277. B. C. He reduced all the fundamental principles of pure mathematics, which had been delivered down by Thales, Pythagoras, Eudoxus, and other mathematicians before him, into regularity and order, and added many others of his own diſcovering; on which account he is ſaid to be the firſt who reduced arithmetic and geometry into the form of a ſcience. He likewiſe applied himſelf to the ſtudy of mixed mathematics, and eſpecially to aſtronomy, in which he alſo excelled. The moſt celebrated of his works is his Elements of Geometry, of which there have been a great number of editions in all languages; and a fine edition of all his works was printed in 1703, by David Gregory, Savilian profeſſor of aſtronomy at Oxford.

EUCRASY, (of *ευ well*, and *κρασις temperature*), in medicine, an agreeable well proportioned mixture of qualities, whereby a body is ſaid to be in good order and diſpoſed for a good ſtate of health.

EUDIOMETER, an inſtrument for obſerving the purity of the atmoſpherical air, or the quantity of pure dephlogiſticated or vital air contained in it, chiefly by means of its diminution on a mixture with nitrous air*. Several kinds of theſe have been invented, the principal of which are the following.

* See *Aerology*, n° 60, 154.

1 Dr Prieſtley's eudiometer.

I. The eudiometer originally uſed by Dr Prieſtley is a divided glaſs tube, into which, after having filled it with common water, and inverted it into the ſame, one or more meaſures of common air, and an equal quantity of the nitrous kind, are introduced by means of a ſmall phial, which is called the *meaſure*; and thus the diminution of the volume of the mixture, which is ſeen at once by means of the graduations of the tube, inſtantly diſcovers the purity of the air required.

2 Landriani's eudiometer.

II. The diſcovery of this property of nitrous air and the eudiometer by Dr Prieſtley, ſoon produced various attempts to improve on the principle, and conſtruct more elegant and accurate machines for diſcovering the ſmalleſt inequality in the conſtitution of the atmoſphere. The firſt of theſe was contrived by Mr Landriani; an account of which is publiſhed in the ſixth volume of M. Roſier's Journal for the year 1775. It conſiſts of a glaſs tube, fitted by grinding to a cylindrical veſſel, to which are joined two glaſs cocks and a ſmall baſon; the whole being fitted to a wooden frame. Quickſilver is uſed in this inſtrument inſtead of water; but the uſe of that fluid occaſions an inconvenience, becauſe the nitrous air acts upon the metal, and renders the experiment ambiguous.

3 Inconvenience attending its uſe.

4 Magellan's firſt eudiometer.

III. In 1777 Mr Magellan publiſhed an account of three eudiometers invented by himſelf. The firſt of theſe, repreſented Plate CLXXXVI. fig. 1. conſiſts of a glaſs tube *MD*, about 12 or 15 inches long, and quite cylindrical throughout, having the upper orifice cloſed with a ground-glaſs ſtopple *M*. A veſſel *C* is joined to the lower part of the tube, and likewiſe well adapted by grinding. This veſſel has three necks, as repreſented in the figure: one of which ſerves to join it to the tube *M*; the other two are ground to thoſe of the phials *A* and *B*, whoſe capacities muſt be as equal as poſſible, as well to each other as to the tube *MD*. *Z* repreſents a braſs ring which ſlides up and down the tube *MD*, and by a finger-ſcrew may be tightened or ſlackened at pleaſure, and ſet to any place upon it. *G* is a braſs or wooden ruler divided into equal parts, with two ſemicircular braſs pieces, by which it may be eaſily applied and kept near the glaſs tube *MD*, as is ſhown at *F*; where it muſt be kept cloſe to the neck, or upper extremity of the tube, by the notch *I*. In uſing this inſtrument, we muſt firſt remove the ſtopple *M*, after which the inſtrument is to be entirely filled with water by dipping it in the tub. The ſtopple is then to be replaced; taking care that no bubble of air may remain either in the tube, the veſſel *C*, or the two phials *A B*. The lower part of the inſtrument, viz. about as far as the middle of the tube, muſt then be kept under water, and one of the phials *A* or *B*, now filled with water, is to be removed from the neck of the veſſel *C*, and filled with the air of which we deſign to try the purity, in the manner directed under the article GAS; after which it is to be replaced into the neck of the veſſel *C*; and in like manner the other phial muſt be filled with nitrous air, and replaced in the other neck. Taking the inſtrument then out of the water, the veſſel *C* muſt be turned with the bottom upwards, as repreſented at *F*; in which caſe, the two elaſtic fluids contained in the phials will aſcend into the veſſel *C*; where, mixing together, the diminution will be effected. But as ſoon as the veſſel is turned round, the inſtrument muſt be plunged in water as far as about the middle of the tube, and the ſtopple *M* removed. As the bulk of the two elaſtic fluids diminiſhes, the water in the tube *MD* deſcends. This inſtrument is ſubject to ſome errors, ariſing from the greater or leſſer height of the column of water in the tube *MD*, as it is held more or leſs perpendicular; it may alſo vary by the very act of putting in the ſtopple *M*. Another and ſtill greater fault is, that it cannot admit but one meaſure of nitrous to one of common air, which is a very uncertain method of eſtimating the purity of a given kind of reſpirable air. The diviſions on the ſcale are likewiſe too large, and it does not ſeem capable of any great accuracy.

Eudiometer.

5 Inaccuracy of this inſtrument.

6 His ſecond eudiometer.

The ſecond kind of eudiometer conſtructed by M. Magellan is repreſented fig. 2. and conſiſts of a glaſs tube *TC*, two or three feet long, and having a cavity as nearly cylindrical as poſſible. One of the ends, *C*, is bent forwards as repreſented in the figure; the other at *T* is open, and may terminate in a funnel, to obviate the neceſſity of uſing a ſeparate one. The whole tube is faſtened by means of two loops to the braſs ſcale *GWN*. *N* is a glaſs phial, having its neck *V* ground air-tight to the inſide of the end of the tube *T*; the whole phial containing one half of what the tube *TC* is capable of containing; but the phial *ABC*, at the other end, muſt contain three or four times the quantity that *N* can contain; and the neck of it muſt alſo be ground air-tight to the end *C* of the tube. The ſcale *CWTV* is divided into 128 parts, the diviſions being ſet from *T* towards *C*; and the cavity of the tube between the firſt and laſt of them being double the capacity of the phial *N*. *XR* is a tin-veſſel, which may ſerve as a caſe for packing the whole inſtrument and its appendages; as alſo for a trough for holding water when experiments are to be made. The glaſs tube *g h*, and the glaſs ſtopple *M*, are both ground air-tight to the mouth *V* of the tube, in order to be put into it occaſionally. To uſe this kind of eudiometer, let the inſtrument be immerſed under water in the tin-

veſſel;

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EUDIOMETER.

Plate CLXXXVI.

Fig. 1.

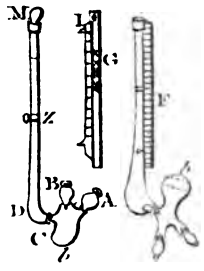


Fig. 2.

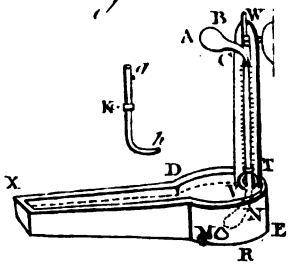


Fig. 3.

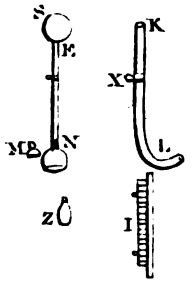


Fig. 4.

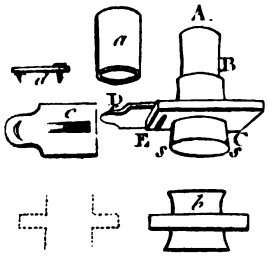


Fig. 6.

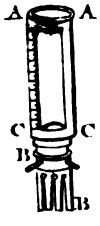


Fig. 9.

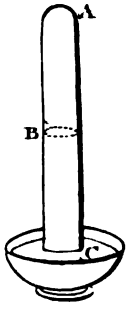


Fig. 8.

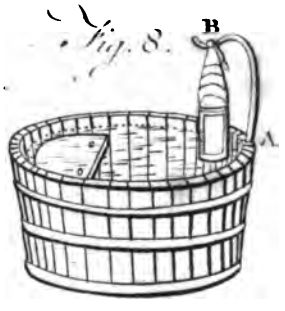


Fig. 5.

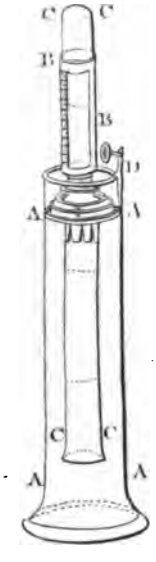


Fig. 7.

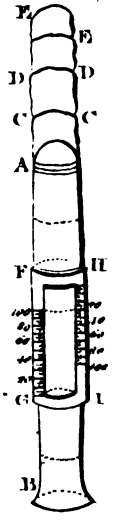


Fig. 10.

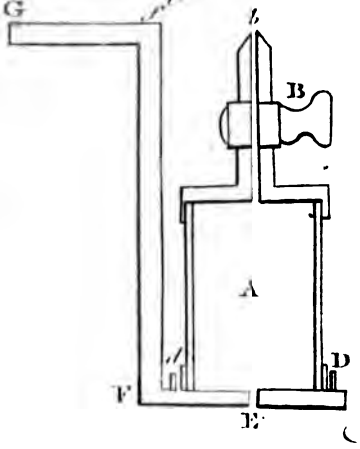


Fig. 11.

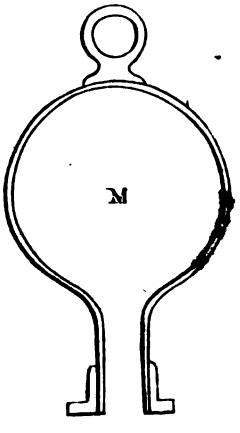


Fig. 12.

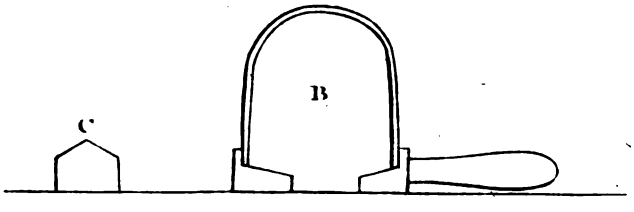
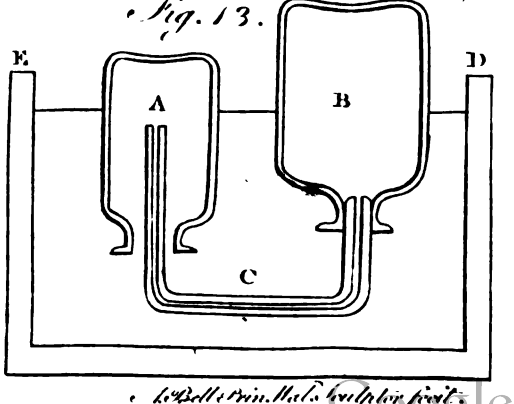


Fig. 13.



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Eudiometer.

veſſel; then let the phial *N*, when filled with water, be put into *CED*, the inſide ſocket of the tin-veſſel. Fill it then with nitrous air; and let this quantity be thrown into the phial *ABC*, which is to be fixed ſomewhat tight to the mouth *C* of the eudiometer. The ſame phial *N* is afterwards filled with the air of which we wiſh to try the quality; and raiſing the end of the inſtrument *C*, it is then put into the mouth *V*. The inſtrument is then to be placed upright as in the figure, by hanging it on the hook *W*; and as ſoon as this laſt air goes up to the phial *ABC*, the phial *N* is to be taken off, that the diminution of the two mixed airs may be ſupplied from the water in the tin-veſſel: the mouth *V* of the eudiometer being all this time held under water. The bent tube *g b*, having the braſs ring *K* fitted to it, is then put to the lower end *V* of the eudiometer. By obſerving the ſurface of the water in the ſmall tube, which thus forms a true ſyphon with the tube of the inſtrument, and by means of the braſs ring *K*, the ſtationary ſtate of diminution in the mixture may be diſtinguiſhed; which being aſcertained, the ſmall tube *g b* is taken off from the eudiometer, and the whole inſtrument laid down for ſome minutes in the water of the tin-veſſel; after which the mouth *V* is to be ſhut up with the glaſs-ſtopple *M*; and, reverſing the inſtrument, it is hanged up by the end *V* upon the hook *W*. By this poſition the whole diminiſhed air of the veſſel *ABC* goes up to the top, where its real bulk is ſhown by the ſcale facing the inſide ſurface of the water. This number being deducted from 128, gives the comparative wholeſomeneſs of the air already tried without any farther calculation. "But this proceſs (ſays Mr Magellan) will be ſtill eaſier, when the laſt diminution of the two kinds of air is only required in the obſervation; becauſe no uſe will then be made of the ſyphon. In ſuch a caſe the inſtrument is left hanging on the hook *W* for 48 hours; after which it is laid down under the water of the trough in an horizontal poſition for 8 or 12 minutes, in order to acquire the ſame temperature with the water: the mouth *V* is then ſhut up with the ſtopple *M*; the inſtrument is hung by the end *V* in a contrary poſition; and the laſt real bulk of the good mixed air will then be ſhown by the number of the braſs ſcale anſwering to the inſide ſurface of the water.

7 His third eudiometer.

IV. The third eudiometer conſtructed by Mr Magellan is repreſented fig. 3. where *EN* repreſents an uniformly cylindrical glaſs tube about two or three feet long, with a large ball *S* and a glaſs ſtopple *M*, fitted air-tight to the mouth *N*, which ought to be wide and funnel-ſhaped, unleſs a ſeparate funnel is made uſe of. *KL* is a ſmall ſyphon with a braſs ring *X*; *Z* a ſmall phial, the contents of which do not exceed one third of the ball *S*, or one half of the glaſs tube. Laſtly, the inſtrument has a ruler *I*, divided and ſtamped like the ſcale already mentioned, with a glaſs funnel, which is ground to the mouth *N* of the inſtrument, when this is not funnel-ſhaped as above directed. When this eudiometer is to be made uſe of, it muſt be filled with water, and ſet in a vertical poſition, with the mouth *N* under the ſurface of the water in a tub or trough. The phial *Z* is to be filled with nitrous air, and thrown into the tube by means of a glaſs funnel, if the mouth of the eudiometer tube be not ſufficiently wide to anſwer the purpoſe. The ſame phial *Z* is then to be filled with the air to be tried; after which the ſyphon *KL* is to be immediately added to the mouth *N* of the eudiometer under the ſurface of the water, ſome of which is to be poured into it. The ſtationary moment of the greateſt diminution of the two airs is watched by means of the ring *X*; and, when that moment arrives, the ſyphon *KL* is to be taken off; the eudiometer is laid for ſome minutes under water in an horizontal poſition or nearly ſo; but taking care that none of the incloſed air may eſcape: the mouth *N* is then ſhut up with the glaſs ſtopple *M*, and the inſtrument is inverted with the mouth *N* upwards. Laſtly, the ſpace occupied by the reſiduum of the diminiſhed air is meaſured by applying to its ſide the divided ruler or ſcale, and the reſult is eſtimated as has been already explained.

Eudiometer.

8 Inconveniences of all theſe inſtruments.

On all theſe eudiometers it is very obvious to remark, that they are complicated and difficult to be uſed; and it is beſides no eaſy matter to get them made with the requiſite accuracy. Mr Cavallo obſerves alſo, that the conſtruction of all the three is founded on a ſuppoſition that the mixture of nitrous and atmoſpherical air, after having continued for ſome time to diminiſh, increaſes again; but he informs us that this is a miſtake, and that Mr Magellan himſelf owned it to be ſo. But the worſt of all is, that they are by no means accurate, as appeared from ſeveral experiments made by Mr Magellan in Mr Cavallo's preſence, with air taken out of the window of the room where the experiments were performed. By the firſt trial, the diminution was 48 parts out of 132 of the mixture: on a ſecond trial, the ſame elaſtic fluids being ſtill uſed, the diminution was 58 parts out of 132: on a third trial, the diminution was again 48; and by a fourth one, it was 51. Nay, Mr Magellan himſelf owned that, after many experiments with his eudiometers, he never could obtain any conſtant reſult, even when the nitrous and common air which he made uſe of were preciſely of the ſame quality.

9 Fontana's eudiometer.

V. A preferable method of diſcovering the purity of the air by means of an eudiometer is recommended by M. Fontana; of which Mr Cavallo ſays, that its accuracy is ſuch as could ſcarce be believed by thoſe who have not had an opportunity of obſerving it. The inſtrument is originally nothing more than a divided glaſs tube, though the inventor afterwards added to it a complicated apparatus, which, in Cavallo's opinion, was altogether uſeleſs. The firſt ſimple eudiometer conſiſted only of a glaſs tube, as uniformly cylindrical as poſſible in its cavity, about 18 inches long, and $\frac{1}{4}$th of an inch in diameter in the inſide, hermetically ſealed at one end (A). The outſide of this tube was marked with a diamond, or had circles drawn round it at the diſtance of three inches from one another, beginning at the cloſed end of the tube; or at ſuch diſtances

(A) To obſerve whether the cavity of a glaſs tube is perfectly cylindrical, pour into it at different times equal quantities of mercury or water, one upon the other; obſerving each time, by means of a divided ruler, if thoſe equal quantities of liquor fill equal lengths of the tube.

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Eudiometer.

stances as are exactly filled by equal measures of elastic fluids. When the parts of these divisions were required, the edge of a ruler, divided into inches and smaller parts, was held against the tube; so that the first division of the ruler might coincide with one of the marks on the tube. The nitrous and atmospherical air are introduced into this tube, in order to be diminished, and the purity of the atmospheric air thus ascertained; but that an equal quantity of elastic fluid may always be certainly introduced, M. Fontana contrived the following instrument as a measure, which cannot be liable to any error. It is represented fig. 4. and consists of a glass tube *AB*, about two inches long and one in diameter, closed at the end *A*, and having a brass piece *BCDE* cemented on the other, containing a sliding door *D*; which when pushed into its proper cavity, shuts the mouth of the tube or measure *AB*; and when pulled out, as represented in the figure, opens it. To prevent it from being pulled out entirely, a spring *E* is screwed upon the flat part of the brass piece, the extremity of which bears upon the head of a brass pin, which passing through a hole, rubs against the door *D*; and when this is pulled nearly out, the pin, falling into a small cavity, prevents it from coming quite out. The diameter of the brass piece is nearly the same with that of the glass tube *AB*; and near its mouth *C* there are two notches made with a file.

10 His instrument for measuring a quantity of air exactly.

Under the same figure the cavity of the brass piece and the parts of the measure are shown separately, *viz.* *a*, the glass tube; *b*, the brass piece; *c*, the sliding brass door inverted in such a manner as to exhibit the cavity for the pin; *d*, the pin with the spring and small screw. The inside surface of this measure, as well as of the long tube, should have the polish taken off by rubbing with emery; as this prevents the water, when the experiments are made, from adhering to it in drops, and thus the measurements will be more exact.

11 Method of using this eudiometer.

To use this apparatus, the long tube must be filled with water; and being inverted in the tub of water described under the article Gas. furnished with a shelf, the measure, being also filled with water, is inverted over an hole in the shelf; and in order to fill it with the elastic fluid required, a phial containing it is brought under the hole; where being inclined a little, part of the gas escapes and passes into the measure. The water then escapes through the notches *ss*, made with the file in the mouth of the measure, as already mentioned (B). The door of the measure is then shut by pushing it in as far as it will go; and the measure, being drawn off from the shelf, but still kept under water, is turned with the mouth upwards; by which means the superfluous quantity of elastic fluid, remaining in the cavity of the brass piece by reason of its being separated by the sliding piece, escapes, and has its place occupied by water. The measure being then again inverted with its mouth downwards, is set any where on the shelf of the tub; the long tube put over the hole of the shelf, and the air transferred from the measure to this tube, as has already been directed for filling the measure itself.

Eudiometer.

When M. Fontana made use of this eudiometer, he commonly threw in two measures of respirable air into the tube; then he added one measure of nitrous air: but as soon as the latter was entered, he removed the tube from the shelf, holding it by the upper end, and agitating it for about 20 seconds in the water. The tube was then rested upon the side of the tub, while the measure was again filled with nitrous air; then putting the tube upon the shelf, and holding it as nearly perpendicular as he could, he applied the divided edge of the ruler to it, in order to observe the diminution of the two fluids. After this he threw in a fourth measure of nitrous air; and after shaking and letting it rest for some time, he observed again the diminution of the two elastic fluids.

12 Why this eudiometer is so accurate.

"That this method (says Mr Cavallo) should be very accurate, may perhaps appear somewhat mysterious; but the mystery will soon vanish, if it be considered that the accurate result depended not so much on the particular construction of the instrument, as on the regular management of it and uniformity of the operation. The exactness of the measure indeed contributed a great deal; but M. Fontana observed, that with exactly the same quantities of nitrous and common air, very different results could be occasioned by their being left a longer or shorter time before the instrument was agitated, or by being agitated much or little, as well as several other circumstances, which to a superficial observer would appear to be of little consequence. He therefore performed the operation always in a similar manner, *viz.* by agitating the tube always for the same length of time, and always with equal quickness; by which means, when the same elastic fluids were used, the results of the experiments were so nearly the same, that the difference, if any could be observed, might be neglected without any impropriety."

13 Is still liable to some small errors.

Notwithstanding the accuracy of this instrument, however, M. Fontana found that it was still liable to some small errors arising from the following sources. 1. The elastic fluid within the tube, when the greatest part of it is filled with water, and the tube is kept out of the water excepting its mouth, is not of the same density with the outward or atmospheric air, on account of the pillar of water in the tube; which, according as it is longer or shorter, counterbalances more or less the pressure of the atmosphere upon the quantity of elastic fluid contained in the upper part of the tube; which quantity of elastic fluid of consequence occupies a greater or less space in the tube, according to the greater or less pressure it endures. This error, however, becomes insensible when the column of water is very short, and the surface of the water on the outside coincides nearly with that on the inside of the tube. 2. The difficulty of keeping the instrument perpendicular in the act of measuring the diminution. And, 3. The still greater difficulty of observing with what division of the ruler the surface of the water within the tube coincided.

14 Fontana's method of avoiding these errors.

To avoid these errors, M. Fontana made use of the following contrivance. *AAAA*, fig. 5. represents a strong glass tube about 3 inches diameter, and 18 inches

(B) The measure would be filled with elastic fluid though these notches were not made, but not so readily, because the water could not easily get out.

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Eudiometer.

inches long, with a foot of glaſs all made of one piece. Within about an inch of the mouth of this tube a braſs ring is faſtened, which contains two braſs rings moveable upon oppoſite centres, in the ſame manner that ſea-compaſſes are uſually ſuſpended, and which are commonly called *gingles*. *CCCC* repreſents the meaſuring tube or eudiometer; which is exactly the ſame with that already deſcribed, having lines marked upon its outſide ſurface to ſhow the ſpaces occupied by equal meaſures of elaſtic fluid. The ſcale *BB* is adapted to this tube, which is ſhown ſeparately in fig. 6. It conſiſts of two braſs ſlips *AC*, *AC*, connected by two braſs rings *AA*, *CC*, through which the eudiometer tube paſſes. To the loweſt of theſe rings a perforated braſs piece *BB*, furniſhed with croſs pins or pivots, is ſcrewed; and, by means of longitudinal cuts, its lower extremity is rendered ſpringy; ſo that when all the piece *AB*, *AB* is put upon the eudiometer tube, the latter cannot ſlip from within the former, unleſs the operator forces it. When the eudiometer tube, with the ſcale, &c. is put together, as repreſented fig. 5. the croſs pins of the piece *BB*, fig. 6. reſt upon the inner ring of the gingle at *AA*, fig. 5. by which means the tube *CCCC* is kept perpendicular within the tube *AAAA*, provided this latter be ſituated ſo nearly perpendicular that the former may not touch the ſide of it, which would prevent it from acquiring the poſition deſired. One of the braſs ſlips *AC*, fig. 6. is divided into equal parts; 100 of which are equivalent to the ſpace between two of the marks on the eudiometer tube *CCCC*, fig. 5. and conſequently ſhow the parts of a meaſure. Theſe diviſions are numbered from the upper edge of the lower ring connecting the two braſs ſlips, *AC*, *AC*.

When this inſtrument is to be uſed, one or more meaſures of reſpirable air are thrown into the eudiometer tube; a meaſure of nitrous air is then added; and after ſhaking the tube for ſome time, it muſt be introduced into the large tube *AAAA*, which for this purpoſe muſt be plunged into the water of the tub; for the mouth of the eudiometer tube muſt not at preſent be taken out of the water. After it has been introduced into the large tube, the whole is taken out of the water, and ſet upon the ſhelf or a table. Now the large tube *AAAA* is filled with water, and the eudiometer tube ſuſpended perpendicularly in it by means of the croſs pins or pivots of the braſs piece annexed to the ſcale, which reſts upon the inner ring of the gingle. The operator muſt then ſlide the tube *CCCC* up and down through the ſcale and braſs piece, &c. till the ſurface of the water within the tube coincides exactly with the upper edge of the lower ring that connects the two braſs ſlips of the ſcale piece, which may be done very accurately by means of a magnifying glaſs. The ſurface of the water within the eudiometer is concave; and when viewed horizontally, it appears like a dark line or limit exceedingly well defined; ſo that the middle or lowermoſt point of it may be made to coincide with the edge of the braſs ring with great preciſion, except when ſome drops of water hang on the outſide of the tube, which ſhould therefore be wiped off.

Having aſcertained this point, we muſt next obſerve which diviſion of the ſcale coincides with one of the circular diviſions marked upon the glaſs tube *CCCC*, which will ſhow the parts of a meaſure. Thus ſuppoſe, that when the eudiometer tube is fixed, ſo that the ſurface of the water in it coincides perfectly with the edge of the lower braſs ring, viz. with the beginning of the diviſions; that the 70th diviſion of the ſcale falls upon the firſt circular mark, as repreſented in the figure; then it is plain, that the quantity of elaſtic fluid contained in the tube is equal to one meaſure and 70 hundredth parts more. This being obſerved, and the large tube again immerſed in the water, the eudiometer-tube is removed from it, but always taking care that its mouth be not lifted up above the ſurface of the water. Another meaſure of nitrous air muſt now be introduced into the eudiometer-tube; which, after being agitated as already directed, is to be put into the large tube *AAAA*. The whole is then taken out of the water, and the diminution of the elaſtic fluid obſerved as above directed.

Thus the eudiometer tube is kept quite perpendicular, and the pillar of water in it rendered very ſhort, not exceeding half an inch at moſt. It is eaſy to perceive, however, that if the operator, when furniſhed with the eudiometer-tube only, keeps it ſo far immerged in the water of the tube when he obſerves the diviſions, that the water within the tube may be nearly equal with the edge of the tub; the large tube *AAAA* may be ſpared, and the operation will thus become much more eaſy and expeditious. Little difference can happen from the poſition of the tube; becauſe the braſs ring aſcertains the poſition of the water ſo well, and the difference occaſioned by a few degrees deviation from the true perpendicular is ſo ſmall, that it can ſcarce be perceived.

15 M. Sauſſure's eudiometer.

VI. M. Sauſſure of Geneva has invented an eudiometer, which he ſuppoſes to be more exact than any of thoſe hitherto deſcribed. His apparatus conſiſts of the following parts. 1. A cylindrical glaſs bottle with a ground ſtopple, capable of containing about five ounces and an half, and which ſerves as a receiver for mixing the two airs. 2. A ſmall glaſs phial, whoſe capacity is nearly equal to one third of that of the recipient, and ſerves for a meaſure. 3. A ſmall pair of ſcales which may weigh very exactly. 4. Several glaſs bottles for containing the nitrous or other air to be uſed, and which may ſupply the place of the recipient when broken. The whole of this apparatus may be eaſily packed into a box, and thus tranſported from place to place, and even to the ſummits of very high mountains. The method of uſing it is as follows.

1. The receiver is to be filled with water, cloſed exactly with its glaſs ſtopper, wiped on the outſide, and weighed very exactly. Being then immerged in a veſſel full of water, and held with the mouth downwards, the ſtopple is removed, and, by means of a funnel, two meaſures of common and one of nitrous air are introduced into it one after another: theſe diminiſh as ſoon as they come into contact; in conſequence of which the water enters the recipient in proportionable quantity. After being ſtopped and well ſhaken, to promote the diminution the receiver is to be opened under water; then ſtopped and ſhaken, and ſo on for three times ſucceſſively. At laſt the bottle is ſtopped under water, taken out, wiped very clean and dry, and weighed exactly as before. It is plain, that now when the bottle is filled partly with elaſtic fluid and partly with

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Eudiometer.

with water, it must be lighter than when quite full of water; the weight of it then being subtracted from the former, the remainder shows that quantity of water which would fill the space occupied by the diminished elastic fluid. Now, in making experiments with airs of different degrees of purity, the above mentioned remainder will be greater when the diminution is less, or when the air is more impure, and *vice versa*; and thus the comparative purity between two different kinds of airs may be determined.

16 Inconveniences and errors to which this machine is liable.

On this method it is obvious to remark, that notwithstanding the encomiums bestowed on it by the inventor, it is subject to many inconveniences and errors, principally arising from the inaccuracy of the measure, and the difficulty of stopping the bottle without occasioning a pressure upon the contained elastic fluid, which being variable, must occasion some error in the weight of the bottle.

17 Mr Cavallo's eudiometer.

VII. To avoid the inconveniences to which all these instruments are subject, Mr Cavallo employs a glass tube with its scale and measure, such as is represented fig. 5. the length of the tube being about 16 or 17 inches, and between $\frac{1}{4}$ and $\frac{3}{7}$ of an inch in diameter, and of as equal a bore as possible throughout; having one end sealed hermetically, and the other shaped like a funnel, though not very wide. The whole of this apparatus is represented fig. 7. where *AB* is the glass tube, to the upper end of which a loop *AEC* should be fastened, made of waxed silk-lace, with several cross threads *CC*, *DD*, *EE*, &c. in order to suspend the instrument to a hook *AB*, fig. 8. which should either be fastened to that side of the tube opposite to the shelf, or so constructed that it may be easily fixed and removed again as occasion requires; or it may be made of thick brass wire, the lower extremity of which fits a hole made in the side of the tub. The brass piece with the scale, which slides upon the eudiometer, is formed of two brass slips *FG*, *HI* (fig. 7.), joined by two brass rings, to which they are soldered. One hundred divisions are marked upon one of those brass slips, beginning from the upper edge of the lower ring *GI*, and all together equal to the space contained between two of the marks or measures made upon the glass tube; so that they show the parts of a measure. An hundred divisions are likewise marked upon the other brass slip *HI*, beginning from the lower edge of the upper ring *FH*.—The following directions are given by Mr Cavallo for marking these divisions. "When the tube *AB* is filled with water, a measure of air should be thrown into it in the manner already directed: the tube must then be suspended to the hook by the loop, as represented fig. 8, so high, that the surface of the water within the tube may be very near the surface of the water in the tub, two inches, for instance, above it; then looking horizontally through the tube, a mark should be made by sticking a bit of soft wax upon the tube, just coinciding with the lower part of the surface of the water within it; in which place afterwards a circular mark should be made with the edge of a flint, or with a piece of agate or diamond, but not so deep as to endanger the breaking of the tube. Thus the first measure is marked; and in like manner may any other one be marked. The attentive practitioner, however, should never venture to mark the tube with an indelible stroke after one trial, lest he should be mistaken. The proper method is to mark them first with wax, and then repeat the operation once or twice, in order to correct some errors that might escape the first time; after which the mark may be made with a diamond, flint, or perhaps more conveniently with a file. The polish of the inside of both tube and measure should be taken off with emery; which is a very laborious operation, though it is particularly necessary that the measure should be done in this manner."

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18 Method of using it.

To use this eudiometer, fill the tube with water, taking care that no bubbles of air remain in it; and inverting it with the mouth downwards, leave it in the water leaning against the side of the tub. Fill the measure then with the elastic fluid whose purity is to be tried. Put the eudiometer tube upon the shelf of the tub, keeping it perpendicular, and with the mouth exactly upon the hole of the shelf, and throw the measure of air into it; fill it again with the same air, and throw this likewise into the tube. Then fill it with nitrous air, and throw this also into the tube, which must be shaken immediately after the operation by moving it alternately up and down in the water of the tub for about a quarter of a minute. It is then left a short time at rest and suspended by the hook formerly mentioned, so that the surface of the water in the inside may be about two inches above that in the tub; when the brass scale is slided upon it till the upper edge of the lower ring coincide with the middle part of the surface of the water within the tube, and then we may observe which division of the scale coincides with any of those on the tube; by which means the quantity of elastic fluid remaining in the tube may be clearly seen, even to the hundredth-part of a measure. The following directions are given by our author for noting down the results in a clear and accurate manner.

19 Method of noting down the results of the experiments.

"1. The two measures first introduced into the tube are expressed by a Roman number; after which the single measure of nitrous air is expressed by another Roman number; and the measures, with the parts of a measure remaining in the tube after diminution, are expressed by common numbers with decimals.—Thus, suppose, that after introducing two measures of common and one of nitrous air, and after shaking in the manner above directed, the quantity of fluid remaining in the eudiometer is such, that when the upper edge of the lower ring of the scale coincides with the lower point of the surface of the water in the tube, the 56th division of the scale falls against the second circular division on the tube, then this diminution is marked thus II, I, 2,56; signifying that two measures of common and one of nitrous air, after diminution by being mixed together, occupy the space of two measures and 56 hundredth-parts of a measure.—Lastly, after marking the first diminution, throw a second measure of nitrous air into the tube; shake the instrument; and after a little rest, observe this second diminution: which, supposing it to have reduced the whole bulk to three measures and seven hundredth-parts, is thus marked down, II, II, 3,07. Sometimes one, two, or three measures of nitrous air must still be added, in order to observe the diminution of some very pure species of respirable air. The divisions which begin from the upper ring of the scale-piece of the eudiometer are useful when the quantity of elastic fluid con-

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contained in it is ſo ſmall, that the edge of the lower braſs ring cannot be raiſed ſo high as to coincide with the edge of the water within the tube on account of the ſilk loop: in which caſe the under edge of the upper ring is brought to that point; and we muſt then obſerve which of thoſe diviſions coincides with the firſt circular diviſion upon the tube. If it be aſked, Why the two or more meaſures of nitrous air are not thrown into the tube all at once, and the laſt diminution noted? the anſwer is, That in this method, the effects of ſimilar experiments have not been found equally uniform with thoſe tried in the above mentioned manner.

20 Precautions neceſſary to be obſerved in making the experiments.

2. "In this operation care ſhould be taken to ſhake the tube immediately after the nitrous air has been thrown into it, and to leave it at reſt afterwards for ſome time; otherwiſe the reſults of ſimilar experiments are far from being alike. It is alſo neceſſary to obſerve, that by holding the meaſure or the eudiometer tube with the hand, which is warmer than the water of the tub, the elaſtic fluid undergoes ſome degree of rarefaction, ſo that the event of the experiments may often be rendered precarious. For this reaſon the inſtruments ſhould be held only with the extremities of the fingers and thumb; and before the door of the meaſure be ſhut, or the point of the ſcale on the eudiometer tube be fixed, thoſe inſtruments ſhould be left a ſhort time by themſelves, keeping the hands and breath at a ſufficient diſtance from them."

21 Phenomena to be obſerved in experiments of this kind.

The following are ſome particulars neceſſary to be obſerved in making experiments of this kind.

1. When reſpirable air is mixed with nitrous air, their joint bulk is diminiſhed, and the diminution is greater when the air is purer, *cæteris paribus*, and *vice verſa*.

2. On mixing the two airs together all at once, the enſuing diminution is greater than if the ſame quantity of nitrous air be added to an equal quantity of reſpirable air at different times: and hence it follows, that the quicker the two ſorts of elaſtic fluids are mixed together, the greater is the diminution, and contrarywiſe.

3. Nitrous air of different quality occaſions a different degree of diminution with reſpirable air; and therefore care ſhould be taken to uſe ſuch materials as afford air always of the ſame quality. The moſt proper ſubſtance for this purpoſe is very pure quickſilver; a quarter of an ounce, or even leſs, with a proper quantity of diluted nitrous acid, will produce a great deal of nitrous air, which is always of the ſame quality, provided the metal be always of equal purity; but with other metals, as braſs, copper, &c. the nitrous air made at one time is often different from that made at another, and therefore occaſions a greater or leſs diminution when mixed with common air though preciſely of the ſame ſort.

4. The quality of nitrous air is impaired by keeping, eſpecially when in contact with water; and for this reaſon it ought to be prepared freſh every two or three days.

5. In performing theſe experiments, it ſhould be carefully remarked, that no miſtake ariſe from heat or cold; as the elaſtic fluids are eaſily contracted or expanded by any variation of temperature.

6. Though the greateſt diminution takes place immediately after mixing the reſpirable and nitrous airs together, eſpecially when they are agitated, yet they continue to diminiſh a little for ſome time after; for which reaſon the diminution ſhould be obſerved always at a certain time after the mixture is made. The whole proceſs indeed ought always to be performed in an uniform manner, otherwiſe the reſults will be frequently very diſſimilar.

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7. It muſt be remarked, that the ſurface of the water which lies contiguous to the elaſtic fluid contained in a ſmall veſſel, is very far from being a plane, or even from being always of a ſimilar figure in the ſame veſſel, on account of the attraction or repulſion between the ſubſtance of the glaſs and water. This is altered by many circumſtances, particularly by the adheſion of extraneous bodies; whence it is very improper to uſe common open phials for this purpoſe. We muſt alſo take into conſideration the drops of water adhering to the ſides of the veſſel, and the quality of the water in which the operation is performed.

8. In caſe the experiment is to take up ſome hours, in order to obſerve the laſt diminution, it will be proper to notice, by a good barometer, if the gravity of the atmoſphere has ſuffered any alteration during that time; for a difference in its preſſure may occaſion ſome difference in the reſult of the experiments.

9. A ſimple apparatus is always to be preferred to a more complicated one, even though the latter ſhould appear to have ſome advantage over it in point of accuracy. Complex machines are not only expenſive, and ſubject to be eaſily put out of order, but occaſion frequent miſtakes, on account of the operator having generally many things to do and keep in proper order; whence it is eaſy to overlook ſome of them.

22 Of the ſources of error in this kind of experiments.

It has already been remarked, that one ſource of error in the experiments made with eudiometers is the inequality of the column of water in the tube by which the mixture of elaſtic fluids is confined. For example, if a cubic inch of air, taken near the apparatus where the experiment is to be performed, be introduced into a long tube previouſly filled and inverted in water, ſo that the ſurface of the water in the tube may be 20 inches higher than that in the baſon, the air in the upper part will then be found to occupy a conſiderably larger ſpace than if the column of water was ſhorter; becauſe in the former caſe the preſſure of the water in the tube partly counterbalances the preſſure of the atmoſphere, ſo that the latter is leſs able to reſiſt the elaſticity of the confined air. The difference will be much greater if quickſilver be made uſe of inſtead of water, as the weight of that fluid is much greater than that of water. To avoid this, it has been directed to manage matters ſo that the ſurface of the fluid on the outſide may nearly correſpond with that in the inſide of the tube; but this is ſometimes impracticable, eſpecially where quickſilver is uſed, with which the error is more conſiderable than with water: in ſuch caſes, therefore, we muſt have recourſe to calculation, and deduce the real quantity of elaſtic fluid from the apparent ſpace it occupies in a receiver, which is partly filled with it and partly with water or ſome other groſs fluid. For this purpoſe it muſt be remembered, that the ſpaces into which air or any other elaſtic fluid is contracted, are to one another in the inverſe ratio of the preſſures which confine theſe elaſtic fluids: hence the ſpace occupied by a quantity of elaſtic fluid *AB*, (fig. 9.) confined

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Eudiometer.

confined in the tube $A C$ inverted in quickſilver, and filled with it as far as B, is to the ſpace which the ſame quantity of fluid occupies out of the tube, as the preſſure which acts upon it when out of the tube is to the preſſure which acts upon it in the tube; that is, as the height of the barometer, to the ſame height of the barometer deducting the height $B C$ of the quickſilver in the tube. Thus, ſuppoſe that the length $A B$ of the tube occupied by an elaſtic fluid is three inches, and that the length $B C$, filled with quickſilver, is 20 inches; it is required to determine the length of the ſame tube, which the ſame quantity of elaſtic fluid would occupy if the ſurface of the quickſilver in the baſon was brought even with B, viz. if the ſaid elaſtic fluid was only acted upon by the preſſure of the atmoſphere. Firſt obſerve the height of the barometer at that time, which ſuppoſe to be 30 inches; then ſay, As the height of the barometer is to the ſame height deducting the height of the quickſilver $C B$ in the inverted tube $A B$; ſo is the ſpace $A B$ to the real ſpace required; that is, $30 : 30 - 20 :: 3 : \frac{3 \times 30 - 20}{30}$ $= 1$: ſo that one inch is the length of the tube $A C$ which the quantity of elaſtic fluid $A B$ would occupy, if the ſurface B of the quickſilver in it was brought even with that of the quickſilver in the baſon. Here, however, we muſt ſuppoſe the tube $A C$ to be perfectly cylindrical; otherwiſe the calculation would become very intricate by being adapted to the form of the veſſel.

23 Mr Cavendiſh's eudiometer.

VIII. In the 73d volume of the Philoſophical Tranſactions, we have an account of a new eudiometer by Mr Cavendiſh. He prefers the Abbe Fontana's to all the reſt: the great improvement in which (he ſays) is, that as the tube is long and narrow, and the orifice of the funnel not much leſs than the bore of the tube, and the meaſure made to deliver its contents very quick, the air riſes ſlowly up the tube in one continued column; ſo that there is time to take the tube off the funnel, and to ſhake it before the airs come quite into contact; by which means the diminution is much greater and more certain than it would otherwiſe be. Thus, if equal meaſures of nitrous and common air are mixed together in this manner, the bulk of the mixture will, in general, be about one meaſure; but if the airs are ſuffered to remain in contact about a quarter of a minute before they are ſhaken, the bulk will hardly be leſs than one meaſure and one fifth; and it will be very different according to the length of time they are ſuffered to remain before they are ſhaken. In like manner, if, through any fault in the apparatus, the air riſes in bubbles, as in that caſe it is impoſſible to ſhake the tube ſoon enough, the diminution is always leſs than it ought to be. Another very conſiderable advantage ariſing from the method of mixing the airs juſt mentioned is, that the diminution takes place in its full extent almoſt inſtantly; but if they are allowed to remain for ſome time in contact before they are ſhaken, the mixture will continue diminiſhing for many hours afterwards.

24 Why Fontana's method excels the reſt ſo much.

The reaſon of theſe differences, according to our author, is, that, in the Abbe Fontana's method, the water is ſhaken briſkly up and down in the tube while the airs are mixing; by which means every ſmall portion of nitrous air muſt be in contact with water either at the inſtant it mixes with the common air, or at leaſt immediately after; and it ſeems that the water, by abſorbing the nitrous acid the moment it is formed, greatly contributes to the quickneſs of the diminution, as well as to the quantity of it. Hence Mr Cavendiſh was induced to try whether the diminution would not be more certain and regular, if one of the airs were added to the other ſlowly and in ſmall bubbles, the veſſel being kept ſhaking all the while that the mixture was made: and on trial he found that this method fully anſwered his expectations.

25 Advantage of adding one of the airs ſlowly to the others.

The apparatus uſed by our author is, 1. A cylindrical glaſs veſſel A (fig. 10.), with braſs caps at top and bottom. To the upper cap a braſs cock B is fitted: the bottom cap is open, but made to fit cloſe into the braſs ſocket Dd, and is fixed into it in the ſame manner as a bayonet is on a muſket. This ſocket has a ſmall hole E in its bottom, and is faſtened to the board of the tub by the bent braſs FfG, in ſuch a manner that b, the top of the cock, may be about half an inch under water: conſequently, if the veſſel A is placed in its ſocket with any quantity of air in it, and the cock is then opened, the air will run out by the cock; but will do ſo very ſlowly, as it can eſcape no faſter than the water can enter by the ſmall hole E to ſupply its place.

26 Mr Cavendiſh's apparatus deſcribed.

2. Beſides this veſſel, there are three glaſs bottles like M, fig. 11. having each a flat braſs cap at bottom to make it ſtand ſteady, and a ring at top to ſuſpend it; alſo ſome glaſs meaſures of different ſizes, as B fig. 12. having a flat braſs cap at bottom with a wooden handle. Theſe are filled with the air to be meaſured, then ſet upon the braſs knob C fitted to the board of the tub below the ſurface of the water, which drives out ſome of the air, leaving only the proper quantity.

27 His method of mixing the airs, &c.

In mixing the airs together, our author commonly adds the reſpirable ſlowly to the nitrous; to do which, a proper quantity of nitrous gas is put into the bottle M, by means of one of the meaſures already deſcribed, and another quantity of reſpirable air is put into the veſſel A, by firſt filling it with this air, and then putting it on the knob C, as was done by the meaſure; after which the veſſel A is fixed in the ſocket, and the bottle M placed with its mouth over the cock. The quantities of air made uſe of, and the diminution of the mixture, are determined by weighing the veſſels under water in the following manner. From one end of a balance, placed in ſuch a manner as to hang over the tub of water, a forked wire is ſuſpended, to each end of which fork is fixed a fine copper wire; and in trying the experiment, the veſſel A, with the reſpirable air in it, is firſt weighed by ſuſpending it from one of thoſe copper wires, ſo that it may remain entirely under water. The bottle M, with the proper quantity of nitrous air in it, is then hung in the ſame manner on the other wire, and the weight of both together determined. The air is then let out of the veſſel A into the bottle M, and the weight of both veſſels together found a ſecond time; by which we know the diminution of bulk the airs ſuffer on being mixed. Laſtly, the bottle M is taken off, and the veſſel A weighed again by itſelf, which gives the quantity of reſpirable air made uſe of. It is needleſs to determine the quantity of nitrous air by weight; becauſe, as the

Fig. 10, 11.

quantity

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Eudiometer.

quantity used is always sufficient to produce a full diminution, a small difference therein makes no sensible one in the diminution. No sensible error can arise from any difference in the specific gravity of the air; for the thing found by weighing the vessel is the difference of weight of the included air and an equal bulk of water; which, as air is no less than 800 times lighter than water, is very nearly equal to the weight of a quantity of water equal in bulk to the included air. A common balance is not convenient for weighing the bottles under water, without some addition to it: for the lower the vessel of air sinks under water, the more the air is compressed; which makes the vessel heavier, and thereby causes that end of the beam to preponderate. Hence we must either have the index placed below the beam, as in many essay-balances; or by some other means remove the centre of gravity of the beam so much below the centre of suspension, as to make the balance vibrate, notwithstanding the tendency which the compressibility of the air in the vessels has to prevent it.

In this manner of determining the quantities of the air by weight, care must be taken to proportion the lengths of the copper wires in such a manner that the surface of the water in *A* and *M* shall be on the same level, when both have the usual quantity of air in them; as otherwise some errors will arise from the air being more compressed in one than the other. This precaution, indeed, does not entirely take away the error, as the level of the water in *M* is not the same after the airs are mixed that it was before; but in vessels of the size used by our author, this error could never be equal to the 500dth part of the whole; which therefore is quite inconsiderable; but even if it was much greater, it could be of no consequence, as it would always be the same in trying the same kind of air.

The vessel *A* (fig. 10.), used in these experiments, holds 282 grains of water, and is the quantity denominated *one measure* by our author. There are three bottles for making the mixture, with a measure *B* (fig. 12.) for the nitrous air adapted to each. The first of these holds three measures, and the corresponding measure one and one-fourth of the former measure; the second bottle holds six, and the corresponding measure $2\frac{1}{2}$; the third holds 12, and the corresponding measure five. The first bottle and measure are made use of in trying common air, and the others for the dephlogisticated or purer kinds. As the same quantity of respirable air is always made use of, $1\frac{1}{4}$ measure of nitrous air is added to one of the common atmospherical kind; and in trying very pure dephlogisticated air, five measures of the nitrous kind are made use of; and our author is of opinion, that there is no kind of air so pure as to require a greater quantity of nitrous air. The way by which it is known whether a sufficient quantity of nitrous air has been added, is to observe the bulk of the mixture; for if that is not less than one measure, that is, than the respirable air alone, it is a sign that the quantity of nitrous air is sufficient. or that it will produce the proper diminution, unless it be very impure. It must be observed, however, that though the quantity of respirable air will always be nearly the same, as being put in by measure, yet the observed diminution will commonly require some correction. For example, suppose that the observed diminution was 2.353 measures, and that the quantity of respirable air was found to be .985 of a measure; then the observed diminution must be increased by .035, in order to have the true diminution, or that which would have been produced if the respirable air made use of had been exactly one measure; whence the true diminution is 2.388.

Eudiometer.

In weighing common air, our author somewhat abridges the process above described. He does not weigh the vessel *A*, but only the bottle *M* with the nitrous air in it; then mixes the airs, and again weighs the same bottle with the mixture in it, and finds the increase of weight; which added to one measure, is very nearly the true diminution whether the quantity of common air made use of was a little more or a little less than one measure. The reason of this is, that as the diminution produced by the mixture of common and nitrous air is only a little greater than the bulk of the common air, the bulk of the mixture will be very nearly the same whether the bulk of the common air be a little greater or a little less than one measure. Let us suppose, for example, that the quantity of common air made use of is exactly one measure, and that the diminution of bulk on mixing is 1.08 of a measure; then must the increase of the weight of the bottle *M*, on adding the common air, be .08 of a measure. Let us next suppose that the quantity of common air made use of is 1.02 of a measure; then will the diminution, on adding the nitrous air, be $1.08 + \frac{1.02}{1.00}$ or 1.1016 of a measure; and consequently the increase of the weight of the bottle *M* will be 1.1016—1.02, or .0816 of a measure, almost exactly the same as if precisely one measure of common air had been made use of.

28 Of adding the nitrous to the respirable.

The same bottle is made use of, viz. that which holds three measures, when the nitrous is added to the respirable air. In this experiment the bottle *M* is first weighed without any air in it, and then weighed again when full of respirable air, which gives the quantity of the latter made use of. The nitrous air is then put into the vessel *A*, and weighed together with the bottle *M*; after which, having mixed them together, the diminution takes place, and they are weighed again, in order to discover its quantity. In this method a smaller quantity of nitrous air is necessary than in the former. In the first method, it was found that the diminution was scarce sensibly less when one measure of nitrous air was used than with a much larger quantity; so that one measure may be accounted fully sufficient. Our author, however, chose to employ $1\frac{1}{4}$ measure, lest the nitrous air should be impure. There was no sensible diminution whether the orifice of the vessel *A* opening into the bottle *M* was $\frac{1}{10}$th or $\frac{1}{8}$th of an inch; that is, whether the air escaped in small or large bubbles: the diminution was rather greater when the bottle was shaken briskly than otherwise; but all the difference that could be perceived between these two methods of shaking did not exceed .01 of a measure. The diminution, however, was remarkably less when the bottle was not shaken at all; being at first only 0.9; in about three minutes it increased to 0.93; and after being shaken for about a minute, it increased to 0.99; but when gently shaken at first, the diminution was 1.08 on mixing, and did not sensibly increase after that time. Some difference was found to arise from the length of time the air took up in passing from one vessel

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Eudiometer.

to another. When it took up 80 ſeconds, for inſtance, in paſſing from the one bottle into the other, there was a difference of 5 hundredth-parts more than when it took up only 22 ſeconds, and about 2 hundredth-parts more than when it took up 45 ſeconds; but at other times the difference was leſs. As the hole in the plate *Dd*, however, was always the ſame in our author's experiments, the time taken up by the air in paſſing from one veſſel into the other varied ſo little that no perceptible difference could ariſe from that cauſe. A greater difference aroſe from the ſize of the bottles and quality of the water made uſe of. When the ſmall bottle, holding three meaſures, was uſed, and filled with diſtilled water, the diminution of common air was uſually 1.08; but when the bottle was filled with water from the tub, it was .05 leſs. Uſing the bottle which held 12 meaſures, and filled with diſtilled water, the diminution was about 1.15; and with the ſame bottle filled with water from the tub it was uſually 1.08. "The reaſon of this (ſays Mr Cavendiſh) is, that water has the power of abſorbing a ſmall quantity of nitrous air; and the more dephlogiſticated the water is, the more of this air it can abſorb. If the water is of ſuch a nature alſo as to froth or form bubbles on letting in the common air, the diminution is remarkably leſs than in other water. In general the diminution was nearly as great with rain as with diſtilled water; but ſometimes the former would froth a good deal: in which caſe it was no better than water fouled with oak-ſhavings. This difference of diminution, according to the nature of the water, is a very great inconvenience, and ſeems to be the chief cauſe of uncertainty in trying the purity of the air; but it is by no means peculiar to this method, being equally great in that of Fontana's. In his method indeed it makes little difference whether the water be diſpoſed to froth or not; but this is no great advantage, as it is eaſy to find water which will not froth; though it ſhows plainly how little any of the experiments hitherto made on the purity of air can be depended upon." The beſt method of obviating this inconvenience is to be always careful to uſe the ſame kind of water: our author always made uſe of diſtilled water; but found that even this was ſometimes endowed with a greater power of abſorbing nitrous air than at others: and with a view to remedy this, he made the following experiment. Some diſtilled water being purged of its air by boiling, one part was kept for a week in a bottle with dephlogiſticated air, and frequently ſhaken; the other part being treated in the ſame manner with phlogiſticated air. By a mean of three different trials the teſt of common air tried with the firſt of theſe waters was 1.139; the diminution ſuffered by ſhaking nitrous air in it for two ſeconds being about 0.285. The teſt of the ſame air tried with the other water was 1.054, and the diminution by nitrous air only 0.09; the heat of the water in the tub and of the diſtilled waters being 45°. The heat of the water in the tub and the diſtilled waters was then raiſed to 67°; when the teſt of the ſame air tried by the firſt water was 1.100, and by the latter 1.044; the diminution of nitrous air with the firſt water being 0.235; by the latter 0.089. Hence it might ſeem that the obſerved teſt ought to be corrected by the ſubtraction of $\frac{4}{10}$ths of the diminution which nitrous air ſuffers by being ſhaken in the water, and adding 002 for every three degrees of heat above 0; but though this correction will undoubtedly diminiſh the error, he is of opinion that it will not by any means take it away entirely; and from ſome circumſtances it appears that diſtilled water poſſeſſes a property of abſorbing different quantities of nitrous air independent of its heat.

29 Variations ariſing from the ſize of the bottles and quality of the water.

30 Attempt to remedy the inconveniences from the different quality of the water.

Eudiometer.

31 Why the diminution is leſs when the nitrous is added to the reſpirable air.

In the ſecond method, *viz.* when the nitrous acid is added to the common air, the diminution is conſiderably leſs than in the other; the reaſon of which is, that when nitrous and common air are mixed together, the former is deprived of part of its phlogiſton, and is thereby converted into phlogiſticatpd nitrous acid, and in that ſtate is abſorbed by the water; beſides that the common air is phlogiſticated, and thereby diminiſhed: ſo that the whole diminution on mixing is equal to the bulk of nitrous air which is turned into acid, added to the diminution which the common air ſuffers by being phlogiſticated. Now it appears, that when a ſmall quantity of nitrous air comes in contact with a large one of common air, the former is more completely deprived of its phlogiſton, and abſorbed by the water in a more dephlogiſticated ſtate than when a ſmall quantity of common air comes into contact with a large quantity of nitrous: in the ſecond method, therefore, where ſmall portions of nitrous air come in contact with a large quantity of common air, the former, as has been juſt obſerved, is more deprived of its phlogiſton; and therefore a ſmaller quantity of it is required to phlogiſticate the common air than in the former method, where ſmall portions of common air come in contact with a large quantity of nitrous air; ſo that a leſs quantity of the nitrous air is abſorbed in the ſecond method than in the firſt. The common air moſt probably ſuffers an equal diminution in both caſes.

Another proof that a ſmaller quantity of nitrous air is required in this method than the former is, that if common air be mixed with a quantity of nitrous air not ſufficient to phlogiſticate it, the mixture will be more phlogiſticated if the nitrous be added ſlowly to the common air without being in contact with water; the mixture will be found to be ſtill more phlogiſticated than in the ſecond method where the two airs are in contact with water at the time of mixing. The final reſult of Mr Cavendiſh's experiments on this ſubject is, that nitrous air uſed in the firſt method does not phlogiſticate common air more than three-fourths of the ſame quantity uſed in the ſecond way; and not ſo much as one half of the quantity uſed in the third way, viz. by adding the nitrous air ſlowly to the other, without being in contact with water.

32 Concluſions from Mr Cavendiſh's experiments.

With reſpect to the quality of nitrous air uſed in theſe experiments, our author obſerves that it may vary in two reſpects. 1. In purity; that is, in being more or leſs mixed with phlogiſticated or other air. 2. In two parcels of equally pure air, it is poſſible that one parcel may contain more phlogiſton than the other. A difference in the ſecond reſpect will cauſe an error in the teſt, in whatever proportion it be mixed with the reſpirable air; but if it differs in the firſt reſpect, it will ſcarcely cauſe any error unleſs it be uncommonly impure; provided care is taken to uſe a quantity ſufficient to make a full diminution. It muſt be obſerved, however, that if the nitrous air be mixed with fixed air, an error will be occaſioned, becauſe part of the latter is abſorbed while the teſt is trying; but this will hardly be

33 Of the different properties of nitrous air.

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Eudiometer, Eudoſia.

be the caſe, unleſs either the metal from which it is procured be covered with ruſt, or unleſs the water in which it is received contain much calcareous earth ſuſpended by fixed air; as in that caſe, if any of the nitrous acid comes over with the air, it will diſſolve the calcareous earth, and ſeparate ſome fixed air.

To determine whether it be poſſible for nitrous air to differ in the ſecond reſpect, our author procured ſome from quickſilver, copper, braſs, and iron: in making experiments with which, he found that the difference between the teſts tried with the three firſt kinds of air was not greater than what might proceed from the error of the experiment; but thoſe with the air from iron .015 greater than the reſt. From other experiments it appeared that the nitrous air from iron was not only more impure than that from other metals, but that the pure portion it contained had leſs phlogiſton in it than that from copper or quickſilver. He is of opinion, however, that copper affords nitrous air ſufficiently pure for experiments of this kind without having recourſe to quickſilver, as Mr Cavallo adviſes.

In ſome of his experiments, Mr Cavendiſh had occaſion to uſe a larger apparatus, which is repreſented fig. 13. *A* repreſents a bottle containing nitrous air inverted into the tub of water *DE*. *B* is a bottle fitted with a bent glaſs tube *C*. This bottle is to be filled with common air without any water, and is firſt ſlightly warmed by the hand: the end of the glaſs tube is then put into the bottle of nitrous air as repreſented in the figure. As the bottle *B* cools, a little nitrous air runs into it, which inſtantly loſes its elaſticity in conſequence of coming into contact with the atmoſpherical air. This condenſation occaſions an influx of freſh nitrous air, and ſo on till the whole is exhauſted. By this means the nitrous air is added ſlowly to the other without coming into contact with water, till the whole of it has run out from the bottle *A* into *B*; after which the water flows in to ſupply the vacancy occaſioned by the diminution.

EUDOSIA, (Athenia, before her converſion to Chriſtianity), a celebrated lady, the daughter of Leontius, philoſopher of Athens; who gave her ſuch a learned education, that at his death, he left her only a ſmall legacy, ſaying ſhe was capable to make her own fortune: but pleading at Athens without ſucceſs againſt her two brothers, for a ſhare in her father's eſtate, ſhe carried her cauſe perſonally by appeal to Conſtantinople; recommended herſelf to Pulcheria, the ſiſter of the emperor Theodoſius the younger; embraced Chriſtianity, was baptized by the name of *Eudoſia*, and ſoon after married to the emperor. Their union laſted a conſiderable time: but a difference at laſt taking place, on account of the emperor's jealouſy excited by Chryſapius the eunuch, ſhe retired to Jeruſalem, where ſhe ſpent many years in building and adorning churches and in relieving the poor. Dupin ſays, that ſhe did not return thence till after the emperor's death: but Cave tells us, that ſhe was reconciled to him, returned to Conſtantinople, and continued with him till his death; after which ſhe went again to Paleſtine, where ſhe ſpent the remainder of her life in pious works. She died in the year 460, according to Dupin; or 459, according to Cave: the latter obſerves, that on her death-bed ſhe took a ſolemn oath, by which ſhe declared herſelf entirely free from any ſtains of unchaſtity. She was the author of a paraphraſe on the eight firſt books of the Old Teſtament in heroic verſe; and of a great number of poems, which are loſt.

Eudoxians ‖ Evelyn.

EUDOXIANS, a party or ſect of heretics in the fourth century, ſo denominated from their leader Eudoxius, patriarch of Antioch and Conſtantinople, a great defender of the Arian doctrine. The Eudoxians adhered to the errors of the Arians and Eunomians, maintaining, that the Son was created out of nothing; that he had a will diſtinct and different from that of the Father, &c.

EVE. See Vigil.

Eve, the mother of all mankind; who being deluded by the ſerpent, occaſioned the fall, and all its diſmal conſequences. See Adam.

EVELYN (John), a moſt learned and ingenious writer and natural philoſopher, was born at Wotton in Surry, the ſeat of his father, in 1620. After making the tour of Europe, he returned to England about the year 1651, and lived very retired at his rural retreat, Say's Court, near Deptford in Kent; where his diſguſt at the violence and confuſion of the times operated ſo far upon his ſtudious diſpoſition, that he actually propoſed to Mr Boyle the eſtabliſhing a kind of college for perſons of the ſame turn of mind, where they might aſſociate together without care or interruption. It was owing to Mr Evelyn's gratitude to the place of his education, that Oxford became poſſeſſed of the famous Arundelian marbles; which he perſuaded the Lord Henry Howard to beſtow on that univerſity. He was very aſſiduous in tranſmitting to the royal ſociety whatever fell within the compaſs of his inquiries; and uſed humbly to ſtyle himſelf *a pioneer in the ſervice*. When the number of books he publiſhed is conſidered, the many he left behind him unfiniſhed and unpubliſhed, and the variety of ſubjects on which he employed his time, his induſtry and application are aſtoniſhing. "His life (ſays the honourable Mr Walpole) was a courſe of inquiry, ſtudy, curioſity, inſtruction, and benevolence. The works of the Creator, and the mimic labours of the creature, were all objects of his purſuit. He unfolded the perfections of the one, and aſſiſted the imperfections of the other. He adored from examination; was a courtier that flattered only by informing his prince, and by pointing out what was worthy for him to countenance; and was really the neighbour of the Goſpel, for there was no man that might not have been the better for him. He was one of the firſt promoters of the royal ſociety, a patron of the ingenious and indigent, and peculiarly ſerviceable to the lettered world; for, beſides his writings and diſcoveries, he obtained the Arundelian marbles for the univerſity of Oxford, and the Arundelian library for the royal ſociety: nor is it the leaſt part of his praiſe, that he who propoſed to Mr Boyle the erection of a philoſophic college for retired and ſpeculative perſons, had the honeſty to write in defence of active life againſt Sir George Mackenzie's Eſſay on Solitude. He knew that retirement in his own hands was induſtry and benefit to mankind; but in thoſe of others, lazineſs and inutility." There are five ſmall prints of this gentleman's journey from Rome to Naples, drawn and etched by him; and among his publiſhed works are, 1. A Character of England; 2. The State of France; 3. An Eſſay on the firſt book of Lucretius *De rerum natura*; 4. The French:

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Evergetus || Eugene

French gardener; 5. A Panegyric on King Charles II's coronation; 6. *Fumifugum*, or the inconveniences of the air and ſmoke of London diſſipated; 7. The Hiſtory and Art of Engraving on Copper; 8. A parallel between the ancient architecture and the modern; 9. Sylva, or a diſcourſe of foreſt-trees; and ſeveral others. This amiable gentleman died, full of age and honour, in 1706 His ſon John Evelyn, born in 1654, diſtinguiſhed himſelf by his elegant tranſlations and poems: He was one of the commiſſioners of the revenue in Ireland; but died early in life, in 1698.

EVERGETES, a ſirname ſignifying *benefactor*, given to Philip of Macedonia, and to Antigonus Doſon, and Ptolemy of Egypt. It was alſo commonly given to the kings of Syria and Pontus, and we often ſee among the former an Alexander Evergetes, and among the latter a Mithridates Evergetes. Some of the Roman emperors alſo claimed that epithet of Benevolent and Humane.

EVERGREEN, in gardening, a ſpecies of perennials, which continue their verdure, leaves, &c. all the year: ſuch are hollies, phillyreas, lauriſtinuſes, bays, pines, firs, cedars of Lebanon, &c.

EVERLASTING PEA. See LYTHYRUS.

EVES-DROPPERS. See *EAVES-Droppers*.

EVESHAM, or EVESHOLM, commonly called *Eſam*, a town of Worceſterſhire, ſeated on a gentle aſcent from the river Avon, over which there is a bridge of ſeven arches. It is 95 miles from London, 14 miles from Worceſter, and has a harbour for barges. It is an old borough, reckoned the ſecond in the county; and ſends two members to parliament It had formerly an abbey with a mitred abbot; which abbey when ſtanding was one of the largeſt and moſt ſtately of any in the kingdom. It was governed by a bailiff, till king James I. at the requeſt of his ſon Prince Henry, gave it a charter for a mayor, 7 aldermen, 12 capital burgeſſes, a recorder, and chamberlain, who are all of the common council, with 24 other burgeſſes called aſſiſtants. Four of the aldermen, and the mayor for the time being, are juſtices of the peace; and of oyer and terminer, and of gaol delivery, for all offences in the corporation, except high treaſon; and the corporation has power to try and execute felons within the borough. Here are two pariſh-churches; but the bells of both have been removed to a beautiful old tower which was one of the gates of the abbey. This town is noted for the great victory obtained near it by Prince Edward, afterwards King Edward I. over Simon Montfort, the great earl of Leiceſter, who was killed in the battle. There is an open proſpect from hence of the ſpacious valley called the *vale of Eveſham* or *vale of Glouceſter*, which ſo abounds with the beſt of corn, as well as paſture for ſheep, that it is reckoned the granary of all theſe parts. The vale runs all along the banks of the Avon, from Tewkeſbury to Perſhore, and to Stratford in Warwickſhire, and the river is ſo far navigable. It has a weekly market and four fairs. The market-houſe built by Sir Edward Hobby has its upper apartments uſed by the corporation for a ſeſſions-houſe, and formerly for the aſſizes of the county. There are conſiderable garden-grounds around the place, the produce of which ſupplies the adjacent towns.

EUGENE (Francis), prince of Savoy, deſcended from Carignan, one of the three branches of the houſe of Savoy, and ſon of Eugene Maurice, general of the Swiſs and Griſons, governor of Champagne, and earl of Soiſſons, was born in 1663. Louis XIV. to whom he became afterwards ſo formidable an enemy, thought him ſo unpromiſing a youth, that he refuſed him preferment both in the church and the ſtate, thinking him too much addicted to pleaſure to be uſeful in either. Prince Eugene, in diſguſt, quitted France; and, retiring to Vienna, devoted himſelf to the imperial ſervice. The war between the emperor and the Turks afforded the firſt opportunity of exerting his military talents; and every campaign proved a new ſtep in his advancement to the higheſt offices in the army. He gave the Turks a memorable defeat at Zenta; commanded the German forces in Italy, where he foiled marſhal Villeroy in every engagement, and at length took him priſoner. Our limits do not allow a detail of his campaigns; but prince Eugene diſtinguiſhed himſelf greatly, when the emperor and queen Anne united againſt the exorbitant power of Louis XIV. He died at Vienna in the year 1736; and was as remarkable for his modeſty and liberality, as for his abilities in the field and the cabinet.

Eugenia || Evil

EUGENIA, the YAMBOO: A genus of the monogynia order, belonging to the icoſandria claſs of plants; and in the natural method ranking under the 19th order, *Heſperideæ*. The calyx is quadripartite, ſuperior; the petals four; the fruit a monoſpermous quadrangular plum. There are two ſpecies, both natives of the hot parts of Aſia. They riſe from 20 to 30 feet high; and bear plum-ſhaped fruit, incloſing one nut. They are too tender to live in this country, unleſs they are conſtantly kept in a ſtove.

EVICTION, in law, ſignifies a recovery of lands or tenements by law.

EVIDENCE, that perception of truth which ariſes either from the teſtimony of the ſenſes or from an induction of reaſon.

EVIDENCE, in law, ſignifies ſome *proof* by teſtimony of men upon oath, or by writings or records. It is called *evidence*, becauſe thereby the point in iſſue in a cauſe to be tried is to be made *evident* to the jury; for *probationes debent eſſe evidentes et perſpicuæ*. The ſyſtem of evidence, as now eſtabliſhed in our courts of common law, is very full, comprehenſive, and refined; far different from, and ſuperior to, any thing known in the middle ages;—as far ſuperior in that as in all other improvements and refinements in ſcience, arts, and manners.

The nature of evidence during the ages of ignorance was extremely imperfect, and the people were incapable of making any rational improvement. Thus it was the imperfection of human reaſon that cauſed the invention and introduction of the ORDEAL, as an appeal to the Supreme Being. As men are unable to comprehend the manner in which the Deity carries on the government of the univerſe, by equal, fixed, and general laws, they are apt to imagine, that in every caſe which their paſſions or intereſt render important in their own eyes, the Supreme Ruler of all ought viſibly to diſplay his power in vindicating innocence, and puniſhing vice.

EVIL, in philoſophy, &c. is either moral or natural. Moral evil is the diſagreement between the actions of a moral agent, and the rule of thoſe actions what

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Evil Euler.

whatever it is*.—Natural evil is, whatever deſtroys or any way diſturbs the perfection of natural beings: ſuch as blindneſs, diſeaſes, death, &c.

* See Moral Philoſophy.

King's Evil, or *Scrophula*. See MEDICINE-*Index*.

Evil-Merodach, the ſon and ſucceſſor of Nebuchadnezzar the Great, king of Babylon, ſucceeded to the crown in the year of the world 3443; but governed the kingdom during the indiſpoſition of his father, who after ſeven years, having recovered his underſtanding, once more aſcended the throne; and, as ſome believe, impriſoned his ſon Evil-Merodach. In this confinement it is ſuppoſed that Evil-Merodach made an acquaintance and friendſhip with Jehoiachim king of Judah, who had been carried to Babylon by Nebuchadnezzar. However that was, it is certain, that, ſoon after his ſucceſſion to the throne, he delivered the king of Judah out of priſon, after a confinement of 37 years, heaped many favours on him, and placed him above all the other kings who were at the court of Babylon, (2 Kings xxv. 27. Jer. lii. 31.) Evil-Merodach reigned but one year, according to the chronology of Archbiſhop Uſher; but Dr Prideaux will have him to have reigned two years, and was ſucceeded by Nerigliſſar his ſiſter's huſband, who having been at the head of a conſpiracy that put him to death, reigned in his ſtead. Others will have it, that this prince was immediately ſucceeded by his ſon BELSHAZZAR.

EULER (LEONARD), profeſſor of mathematics, member of the imperial academy of Peterſburgh, ancient director of the royal academy of Berlin, and fellow of the royal ſociety of London, as alſo correſpondent member of the royal academy of ſciences at Paris, was born at Baſil, April 15th, 1707, of reputable parents. The years of his infancy were paſſed in a rural retreat at the village of Richen, of which place his father was miniſter.—Being ſent to the univerſity of Baſil, he attended regularly the different profeſſors. As his memory was prodigious, he performed his academical taſks with uncommon rapidity; and all the time he gained by this was conſecrated to geometry, which ſoon became his favourite ſtudy. The early progreſs he made in this ſcience, only added new ardour to his application; and thus he obtained a diſtinguiſhed place in the attention and eſteem of profeſſor John Bernouilli, who was at that time one of the firſt mathematicians in Europe. In 1723, M. Euler took his degree as maſter of arts; and delivered on that occaſion a Latin diſcourſe, in which he drew a compariſon between the philoſophy of Newton and the Carteſian ſyſtem, which was received with the greateſt applauſe. He afterwards, at his father's deſire, applied himſelf to the ſtudy of theology and the oriental languages. Though theſe ſtudies were foreign to his predominant propenſity, his ſucceſs was conſiderable even in this line: however, with his father's conſent, he returned to geometry as his principal object. He continued to avail himſelf of the counſels and inſtructions of M. Bernouilli; he contracted an intimate friendſhip with his two ſons Nicholas and Daniel; and it was in conſequence of theſe connections that he became afterwards the principal ornament of the academy of Peterſburg. The project of erecting this academy, which had been formed by Peter the Great, was executed by Catharine I.; and the two young Bernouillis being invited to Peterſburg in 1725, promiſed Euler, who was Euler. deſirous of following them, that they would uſe their utmoſt endeavours to procure for him an advantageous ſettlement in that city. In the mean time, by their advice, he applied himſelf with ardour to the ſtudy of phyſiology, to which he made a happy application of his mathematical knowledge; and he attended the medical lectures of the moſt eminent profeſſors of Baſil. This ſtudy, however, did not wholly engroſs his time: it did not even relax the activity of his vaſt and comprehenſive mind in the cultivation of other branches of natural ſcience. For while he was keenly engaged in phyſiological reſearches, he compoſed A Diſſertation on the Nature and Propagation of Sound, and an anſwer to a prize queſtion concerning the maſting of ſhips; to which the academy of ſciences adjudged the *acceſſit*, or ſecond rank, in the year 1727. From this latter diſcourſe, and other circumſtances, it appears that Euler had early embarked in the curious and important ſtudy of navigation, which he afterwards enriched with ſo many valuable diſcoveries.

M. Euler's merit would have given him an eaſy admiſſion to honourable preferment, either in the magiſtracy or univerſity of his native city, if both civil and academical honours had not been there diſtributed by lot. The lot being againſt him in a certain promotion, he left his country, ſet out for Peterſburg, and was made joint profeſſor with his countrymen Meſſrs Hermann and Daniel Bernouilli in the univerſity of that city. At his firſt ſetting out in his new career, he enriched the academical collection with many memoirs, which excited a noble emulation between him and the Bernouillis; and this emulation always continued, without either degenerating into a ſelfiſh jealouſy, or producing the leaſt alteration in their friendſhip. It was at this time that he carried to new degrees of perfection the integral calculus, invented the calculation of ſinuſes, reduced analytical operations to a greater ſimplicity, and thus was enabled to throw new light on all the parts of mathematical ſcience. In 1730, he was promoted to the profeſſorſhip of natural philoſophy; and in 1733 he ſucceeded his friend D. Bernouilli in the mathematical chair. In 1735, a problem was propoſed by the academy which required expedition, and for the ſolution of which ſeveral eminent mathematicians had demanded the ſpace of ſome months. The problem was ſolved by Euler in three days, to the great aſtoniſhment of the academy; but the violent and laborious efforts it coſt him threw him into a fever, which endangered his life, and deprived him of the uſe of his right eye. The academy of ſciences at Paris, which in 1738 had adjudged the prize to his memoir Concerning the Nature and properties of Fire, propoſed for the year 1740 the important ſubject of the ſea-tides; a problem whoſe ſolution required the moſt arduous calculations, and comprehended the theory of the ſolar ſyſtem. Euler's diſcourſe on this queſtion was adjudged a maſter-piece of analyſis and geometry; and it was more honourable for him to ſhare the academical prize with ſuch illuſtrious competitors as Colin Maclaurin and Daniel Bernouilli, than to have carried it away from rivals of leſs magnitude. Rarely, if ever, did ſuch a brilliant competition adorn the annals of the academy; and no ſubject, perhaps, propoſed by that learned body was ever treated with ſuch ac-

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Euler. accuracy of inveſtigation and force of genius, as that which here diſplayed the philoſophical powers of theſe three extraordinary men.

In the year 1741, M. Euler was invited to Berlin to augment the luſtre of the academy, that was there riſing into fame. He enriched the laſt volume of the miſcellanies *(melanges)*, of Berlin with five memoirs, which make an eminent, perhaps the principal, figure in that collection. Theſe were followed with an aſtoniſhing rapidity by a great number of important reſearches, which are ſcattered through the memoirs of the Pruſſian academy; of which a volume has been regularly publiſhed every year ſince its eſtabliſhment in 1744. The labours of Euler will appear more eſpecially aſtoniſhing, when it is conſidered, that while he was enriching the academy of Berlin with a prodigious number of memoirs, on the deepeſt parts of mathematical ſcience, containing always ſome new points of view, often ſublime truths, and ſometimes diſcoveries of great importance; he did not diſcontinue his philoſophical contributions to the academy of Peterſburgh, which granted him a penſion in 1742, and whoſe memoirs diſplay the marvellous fecundity of Euler's genius. It was with much difficulty that this great man obtained, in 1766, permiſſion from the king of Pruſſia to return to Peterſburgh, where he deſired to paſs the reſt of his days. Soon after his return, which was graciouſly rewarded by the munificence of Catharine II. he was ſeized with a violent diſorder, which terminated in the total loſs of his ſight. A cataract, formed in his left eye, which had been eſſentially damaged by a too ardent application to ſtudy, deprived him entirely of the uſe of that organ. It was in this diſtreſſing ſituation that he dictated to his ſervant, a tailor's apprentice, who was abſolutely devoid of mathematical knowledge, his elements of algebra; which by their intrinſical merit, in point of perſpicuity and method, and the unhappy circumſtances in which they were compoſed, have equally excited applauſe and aſtoniſhment. This work, though purely elementary, diſcovers the palpable characteriſtics of an inventive genius; and it is here alone that we meet with a complete theory of the analyſis of Diophantus.

About this time M. Euler was honoured by the Academy of Sciences at Paris with the place of one of the foreign members of that learned body; and, after this, the academical prize was adjudged to three of his memoirs, *Concerning the Inequalities in the Motions of the Planets*. The two prize queſtions propoſed by the ſame academy for 1770 and 1772 were deſigned to obtain from the labours of aſtronomers *a more Perfect Theory of the Moon*. M. Euler, aſſiſted by his eldeſt ſon, was a competitor for theſe prizes, and obtained them both. In this laſt memoir, he reſerved for farther conſideration ſeveral inequalities of the moon's motion, which he could not determine in his firſt theory, on account of the complicated calculations in which the method he then employed had engaged him. He had the courage afterward to review his whole theory, with the aſſiſtance of his ſon and Meſſrs Krafft and Lexell, and to purſue his reſearches until he had conſtructed the new tables, which appeared, together with the great work, in 1772. Inſtead of confining himſelf, as before, to the fruitleſs integration of three differential equations of the ſecond degree, which are furniſhed by mathematical principles, he reduced them to the three ordinates, which determine the place of the moon; he divided into claſſes all the inequalities of that planet, as far as they depend either on the elongation of the ſun and moon, or upon the eccentricity, or the parallax, or the inclination of the lunar orbit. All theſe means of inveſtigation, employed with ſuch art and dexterity as could only be expected from an analytical genius of the firſt order, were attended with the greateſt ſucceſs; and it is impoſſible to obſerve, without admiration, ſuch immenſe calculations on the one hand, and on the other the ingenious methods employed by this great man to abridge them, and to facilitate their application to the real motion of the moon. But this admiration will become aſtoniſhment, when we conſider at what period and in what circumſtances all this was effectuated by M. Euler. It was when he was totally blind, and conſequently obliged to arrange all his computations by the ſole powers of his memory and his genius. It was when he was embarraſſed in his domeſtic circumſtances by a dreadful fire, that had conſumed great part of his ſubſtance, and forced him to quit a ruined houſe, of which every corner was known to him by habit, which, in ſome meaſure, ſupplied the place of ſight. It was in theſe circumſtances that Euler compoſed a work which, alone, was ſufficient to render his name immortal. The heroic patience and tranquillity of mind which he diſplayed here, needs no deſcription: and he derived them not only from the love of ſcience, but from the power of religion. His philoſophy was too genuine and ſublime to ſtop its analyſis at mechanical cauſes; it led him to that divine philoſophy of religion which ennobles human nature, and can alone form a habit of true magnanimity and patience in ſuffering.

Euler.

Some time after this, the famous Wentzell, by couching the cataract, reſtored Mr Euler's ſight; but the ſatisfaction and joy that this ſucceſsful operation produced, were of ſhort duration. Some inſtances of negligence on the part of his ſurgeons, and his own impatience to uſe an organ, whoſe cure was not completely finiſhed, deprived him of his ſight a ſecond time; and this relapſe was accompanied with tormenting pain. He, however, with the aſſiſtance of his ſons, and of Meſſrs Krafft and Lexell, continued his labours; neither the loſs of his ſight nor the infirmities of an advanced age, could damp the ardour of his genius. He had engaged to furniſh the academy of Peterſburgh with as many memoirs as would be ſufficient to complete its acts for 20 years after his death. In the ſpace of ſeven years he tranſmitted to the academy, by Mr Golſwin, above 70 memoirs, and above 200 more, which were reviſed and completed by the author of this paper. Such of theſe memoirs as were of ancient date were ſeparated from the reſt, and form a collection that was publiſhed in the year 1783, under the title of *Analytical Works*.

Euler's knowledge was more univerſal than could be well expected in one, who had purſued with ſuch unremitting ardour mathematics and aſtronomy as his favourite ſtudies. He had made a very conſiderable progreſs in medical, botanical, and chemical ſcience. What was ſtill more extraordinary, he was an excellent ſcholar, and poſſeſſed what is generally called *erudition*

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Euler || Eumarides.

dition in a very high degree. He had read, with attention and taſte, the moſt eminent writers of ancient Rome; the civil and literary hiſtory of all ages and all nations was familiar to him; and foreigners, who were only acquainted with his works, were aſtoniſhed to find in the converſation of a man, whoſe long life ſeemed ſolely occupied in mathematical and phyſical reſearches and diſcoveries, ſuch an extenſive acquaintance with the moſt intereſting branches of literature. In this reſpect, no doubt, he was much indebted to a very uncommon memory, which ſeemed to retain every idea that was conveyed to it, either from reading or from meditation. He could repeat the Æneid of Virgil, from the beginning to the end, without heſitation, and indicate the firſt and laſt line of every page of the edition he uſed.

Several attacks of a vertigo, in the beginning of September 1783, which did not prevent his calculating the motions of the aeroſtatical globes, were, nevertheleſs, the forerunners of his mild and happy paſſage from this ſcene to a better. While he was amuſing himſelf at tea with one of his grandchildren, he was ſtruck with an apoplexy, which terminated his illuſtrious career at the age of 76. His conſtitution was uncommonly ſtrong and vigorous: his health was good; and the evening of his long life was calm and ſerene, ſweetened by the fame that follows genius, the public eſteem and reſpect that are never with-held from exemplary virtue, and ſeveral domeſtic comforts which he was capable of feeling and therefore deſerved to enjoy.

EULOGY, Eulogia, in church hiſtory. When the Greeks have cut a loaf or piece of bread to conſecrate it, they break the reſt into little bits, and diſtribute it among the perſons who have not yet communicated, or ſend it to perſons that are abſent; and theſe pieces of bread are what they call *eulogies*. The word is Greek, ευλογια, formed of ευ *bene*, "well," and λεγω *dico*, "I ſay, ſpeak;" q. d. *benedictum*, "bleſſed."

The Latin church has had ſomething like eulogies for a great many ages; and thence aroſe the uſe of their holy bread.

The name *eulogy* was likewiſe given to loaves or cakes brought to church by the faithful to have them bleſſed.

Laſtly, the uſe of the term paſſed hence to mere preſents made to a perſon without any benediction. See the Jeſuit Gretſer, in his *Treatiſe de Benedictionibus & Maledictionibus*, lib. ii. cap. 22, 24, &c. where he treats of eulogies thoroughly.

From a paſſage in Bolandus, on the life of St Melaine, cap. 4. it appears, that eulogies were not only of bread, but any kind of meat bleſſed and hallowed for that purpoſe. Add, that almoſt every body bleſſed and diſtributed eulogies; not only biſhops and prieſts, but even hermits, though laymen, made a practice of it. Women alſo would ſometimes ſend eulogies.

The wine ſent as a preſent was alſo held an eulogy. Bolandus remarks farther, that the eucharift itſelf was alſo called *eulogy*.

Eulogy, likwiſe means an encomium on any perſon, on account of ſome virtue or good quality.

EUMARIDES, of ευμαρης "eaſy," among the ancients, a kind of ſhoes common to men and women.—The eumarides were uſed for pomp and delicacy, being neat, and painted with various colours.

EUMENES, a Greek officer in the army of Alexander, ſon of a charioteer. He was the moſt worthy of all the officers of Alexander to ſucceed after the death of his maſter. He conquered Paphlagonia, and Cappadocia, of which he obtained the government, till the power and jealouſy of Antigonus obliged him to retire. He joined his forces to thoſe of Perdiccas, and defeated Craterus and Neoptolemus. Neoptolemus periſhed by the hands of Eumenes. When Craterus had been killed during the war, his remains received an honourable funeral from the hand of the conqueror; and Eumenes, after weeping over the aſhes of a man who once was his deareſt friend, ſent his remains to his relations in Macedonia. Eumenes fought againſt Antipater and conquered him; and after the death of Perdiccas his ally, his arms were directed againſt Antigonus, by whom his was conquered A. U. C. 433, chiefly by the treacherous conduct of his officers. This fatal battle obliged him to diſband the greateſt part of his army to ſecure himſelf a retreat; and he fled only with 700 faithful attendants to a fortified place on the confines of Cappadocia, called *Nora*, where he was ſoon beſieged by the conqueror. He ſupported the ſiege for a year with courage and reſolution, but ſome diſadvantageous ſkirmiſhes ſo reduced him, that his ſoldiers, grown deſperate, and bribed by the offers of the enemy, had the infidelity to betray him into the hands of Antigonus. The conqueror, from ſhame or remorſe, had not the courage to viſit Eumenes; but when he was aſked by his officers, in what manner he wiſhed him to be kept, he anſwered, keep him as carefully as you would keep a lion. This ſevere command was obeyed; but the aſperity of Antigonus vaniſhed in a few days, and Eumenes, delivered from the weight of chains, was permitted to enjoy the company of his friends. Even Antigonus heſitated whether he ſhould not reſtore to his liberty a man with whom he had lived in the greateſt intimacy while both ſubſervient to the command of Alexander; and theſe ſecret emotions of pity and humanity were not a little encreaſed by the petitions of his ſon Demetrius for the releaſe of Eumenes. But the calls of ambition prevailed; and when Antigonus recollected what an active enemy he had in his power, he ordered Eumenes to be put to death in the priſon. His bloody commands were executed 315 years before the Chriſtian era. Such was the end of a man who raiſed himſelf to power by merit alone. His ſkill in public exerciſes firſt recommended him to the notice of Philip; and under Alexander, his attachment and fidelity to the royal perſon, and particularly his military accompliſhments, promoted him to the rank of a general. Even his enemies revered him; and Antigonus, by whoſe orders he periſhed, honoured his remains with a ſplendid funeral, and conveyed his aſhes to his wife and family in Cappadocia. It has been obſerved, that Eumenes had ſuch an univerſal influence over the ſucceſſors of Alexander, that none during his lifetime dared to aſſume the title of king.

Eumenes

Eumenes I. king of Pergamus, who ſucceeded his uncle Philetærus about 264 years before Chriſt. He made war againſt Antiochus the ſon of Seleucus, and enlarged his poſſeſſions by ſeizing upon many of the cities of the kings of Syria. He lived in alliance with the Romans, and made war againſt Pruſias king of Bithynia.

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Eumenes
Eumenidia.

Bithynia. He was a great patron of learning; but being much given to wine, he died of an exceſs in drinking, after a reign of 22 years. He was ſucceeded by Attalus.

EUMENES II. ſucceeded his father Attalus on the throne of Aſia and Pergamus. His kingdom was ſmall and poor, but he rendered it powerful and opulent; and his alliance with the Romans did not a little contribute to the encreaſe of his dominions after the victories obtained over Antiochus the Great. He carried his arms againſt Pruſias and Antigonus; and died 160 years before Chriſt, after a reign of 40 years, leaving the kingdom to his ſon Attalus II. He has been admired for his benevolence and magnanimity; and his love of learning greatly enriched the famous library of Pergamus, which had been founded by his predeceſſors in imitation of the Alexandrian collection of the Ptolemies. His brothers were ſo attached to him and devoted to his intereſt, that they enliſted among his body-guards to ſhow their fraternal fidelity.

EUMENES, a celebrated orator of Athens about the beginning of the fourth century. Some of his harangues and orations are extant. An hiſtorical writer in Alexander's army.

EUMENIDES, a name given to the Furies by the ancients. They ſprang from the blood of the wound which Cœlus received from his ſon Saturn. According to others, they were daughters of Earth, and conceived from the blood of Saturn. Some make them daughters of Acheron and Night, or Pluto and Proſerpine. According to the more received opinions, they were three in number, Tiſiphone, Megara, and Alecto, to which ſome add Nemeſis. Plutarch mentions only one called *Adraſta*, daughter of Jupiter and Neceſſity. They were ſuppoſed to be the miniſters of the vengeance of the gods. They were ſtern and inexorable; and were always employed in puniſhing the guilty upon earth, as well as in the infernal regions. They inflicted their vengeance upon earth by wars, peſtilence, and diſſenſions, and by the ſecret ſtings of conſcience; and in hell they puniſhed the guilty by continual flagellation and torments. They were alſo called *Furiæ* and *Erinnys*. Their worſhip was almoſt univerſal; and people dared not to mention their names or fix their eyes upon their temples. They were honoured with ſacrifices and libations; and in Achaia they had a temple, which when entered by any one guilty of a crime, ſuddenly rendered him furious, and deprived him of the uſe of his reaſon. In the ſacrifices the votaries uſed branches of cedar and of alder, hawthorn, ſaffron, and juniper; and the victims were generally turtle-doves and ſheep, with libations of wine and honey. They were uſually repreſented with a grim and frightful aſpect, with a black and bloody garment, and with ſerpents wreathing round their head inſtead of hair. They held a burning torch in one hand, and a whip of ſcorpions in the other; and were always attended by Terror, Rage, Paleneſs, and Death. In hell they were ſeated around Pluto's throne, as the miniſters of his vengeance.

EUMENIDIA, feſtivals in honour of the Eumenides, called by the Athenians σεμναι θεαι "venerable goddeſſes." They were celebrated once every year, with ſacrifices of pregnant ewes, with offerings of cakes made by the moſt eminent youths, and libations of honey and wine. At Athens none but free-born citizens were admitted, ſuch as had led a life the moſt virtuous and unſullied.

Eumolpides
Eunomians.

EUMOLPIDES, the prieſts of Ceres at the celebration of her feſtivals at Eleuſis. They were deſcended from Eumolpus, a king of Thrace, who was made prieſt of Ceres by Erechtheus king of Athens. He became ſo powerful after his appointment to the prieſthood, that he maintained a war againſt Erechtheus. This war proved fatal to both. Erechtheus and Eumolpus were both killed, and peace was re-eſtabliſhed among their deſcendants, on condition that the prieſthood ever remained in the family of Eumolpus, and the regal power in the houſe of Erechtheus. The prieſthood remained in the family of Eumolpus for 1200 years; and this is ſtill more remarkable, becauſe he who was once appointed to the holy office was obliged to remain in perpetual celibacy.

EUMOLPUS, a king of Thrace, ſon of Neptune and Chione. He was thrown into the ſea by his mother, who wiſhed to conceal her ſhame from her father. Neptune ſaved his life and carried him into Æthiopia, where he was brought up by a woman, one of whoſe daughters he married. An act of violence to his ſiſter-in-law obliged him to leave Æthiopia, and he fled to Thrace with his ſon Iſmarus, where he married the daughter of Tegyrius the king of the country. This connection to the royal family rendered him ambitious; he conſpired againſt his father-in-law, and fled, when the conſpiracy was diſcovered, to Attica, where he was initiated in the myſteries of Ceres of Eleuſis, and made hierophantes or high prieſt. He was afterwards reconciled to Tegyrius, and inherited his kingdom. He made war againſt Erechtheus, king of Athens, who had appointed him to the office of high prieſt, and periſhed in battle about 1380 years before the Chriſtian era. His deſcendants were alſo inveſted with the prieſthood, which remained for about 1200 years in that family.

EUNAPIUS, a native of Sardis in Lydia, a celebrated ſophiſt, phyſician, and hiſtorian, who flouriſhed in the 4th century, under the emperors Valentinian, Valens, and Gratian. He wrote "The lives of the Philoſophers and Sophiſts," in which he frequently ſhows himſelf a bitter enemy to the Chriſtians: alſo a "Hiſtory of the Ceſars," which he deduced from the reign of Claudius where Herodian left off, down to that of Arcadiusand Honorius. The hiſtory is loſt; but we have the ſubſtance of it in Zoſimus, who is ſuppoſed to have done little more than copy it.

EUNOMIANS, in church-hiſtory, Chriſtian heretics in the 4th century. They were a branch of Arians, and took their name from EUNOMIUS biſhop of Cyzicus; whoſe confeſſion of faith here follows, extracted from Cave's *Hiſtoria Literaria*, vol. 1. p. 223. "There is one God uncreated and without beginning; who has nothing exiſting before him, for nothing can exiſt before what is incarnate; nor with him, for what is uncreate muſt be one; nor in him, for God is a ſimple and uncompounded being. This one ſimple and eternal being is God, the creator and ordainer of all things: firſt indeed and principally of his only begotten Son; and then, through him, of all other things. For God begot, created, and made, the Son, only by his direct operation and power, before all things, and every

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Eunomius, Eunuch.

every other creature; not producing, however, any being like himſelf, or imparting any of his own proper ſubſtance to the Son: for God is immortal, uniform, indiviſible; and therefore cannot communicate any part of his own proper ſubſtance to another. He alone is unbegotten; and it is impoſſible that any other being ſhould be formed of an unbegotten ſubſtance. He did not uſe his own ſubſtance in begetting the Son, but his will only: nor did he beget him in the likeneſs of his ſubſtance, but according to his own good pleaſure. He then created the Holy Spirit, the firſt and greateſt of all ſpirits, by his own power indeed and operation mediately, yet by the immediate power and operation of the Son. After the Holy Spirit he created all other things in heaven and in earth, viſible and inviſible, corporeal and incorporeal, mediately by himſelf, by the power and operation of the Son," &c.

EUNOMIUS, a famous hereſiarch of the 4th century, the diſciple of Elius, but abundantly more ſubtile than his maſter, as well as more bold in propagating the opinions of his ſect, who after him are called EUNOMIANS. He was ordained biſhop of Cyzicus; but gave ſo much diſturbance by the intemperance of his zeal, that he was depoſed more than once. At laſt, tired with being toſſed about, he petitioned to retreat to the place of his birth, Dacora in Cappadocia; where he died very old about the year 374, after experiencing a variety of ſufferings. The greateſt part of his works are loſt. There is, however, beſides two or three ſmall pieces, a confeſſion of his faith remaining, which Cave inſerted in his *Hiſtoria Literaria*, from a manuſcript in archbiſhop Tenniſon's library. See the preceding article.

EUNUCH, a caſtrated perſon. See the article CASTRATION.—The word is formed from ευνην εχειν, q. d. *lecti curam habet*, "*guardian* or *keeper* of the bed."

In Britain, France, &c. eunuchs are never made but upon occaſion of ſome diſeaſe, which renders ſuch an operation neceſſary: but in Italy they make great numbers of children, from one to three years of age, eunuchs, every year, to ſupply the operas and theatres of all Europe with ſingers. M. de la Lande, in his *Voyage d'Italie*, aſſerts, that there are public ſhops at Naples where this cruel operation is performed, and that over the door of theſe ſhops is inſcribed *Qui ſi caſtrano ragazzi*. But Dr Burney informs us, that he was not only utterly unable to ſee or hear of any ſuch ſhops during his reſidence in that city, but was conſtantly told, both by the natives and Engliſh ſettled there, that the laws againſt ſuch a practice were ſo numerous and ſevere, that it was never performed but with the utmoſt ſecrecy.

In the eaſtern parts of the world, they make eunuchs in order to be guards or attendants on their women. The ſeraglio of the eaſtern emperors are chiefly ſerved and guarded by eunuchs; and yet, from good authority, we learn, that the rich eunuchs in Perſia and other countries keep ſeraglios for their own uſe. Thoſe who, out of an imprudent zeal to guard themſelves from ſenſual pleaſures, made themſelves eunuchs, were, by the council of Nice, condemned and excluded from holy orders. There are ſeveral ſevere prohibitions in Germany againſt the making of eunuchs; and in France an eunuch muſt not marry, not even with the conſent of the woman.

Though the practice of caſtration is deteſtable in every point of view; yet there appears no real foundation for the injurious opinion generally entertained of eunuchs, viz. that they are all cowards, and devoid of genius for literature or any ſolid ſtudy. "As to genius (ſays the author laſt quoted), I never found thoſe of the firſt claſs in muſic deficient in intellectual abilities for more ſerious ſtudies. Indeed I have ſeen real genius and diſpoſition for literary purſuits, in more than one great opera ſinger; and as for compoſition, and the theory of muſic, not only the beſt ſingers of the Pope's chapel ever ſince the beginning of the laſt century, but the beſt compoſers, are among the ſoprani, in that ſervice." With reſpect to the operation affecting the mind ſo much as to deprive it of all fortitude in times of danger, there is great reaſon to doubt the fact: moſt of the generals of eaſtern monarchs having been at all times of this claſs; and the braveſt ſtand that ever was made againſt Alexander the Great was at Gaza, under the command of one of Darius's generals, who was a eunuch. Ammianus Marcellinus gives an account of Menophilus, a eunuch, to whom Mithridates intruſted his daughter; which proves the poſſibility of ſuch unfortunate perſons poſſeſſing a heroiſm equal to that of the moſt determined Stoic. Eunuch.

It is very certain, that the ancients never ſuppoſed eunuchs to have been men of inferior intellects, or that they poſſeſſed leſs vigour of mind than other men. At leaſt the Perſians were not of this opinion; for Herodotus* relates, that when they had taken poſſeſſion of ſome Ionian cities, παιδας τε τους εν ειδεσι λαις εκλεγομενους εξεταμνον, και ευνουχους αντι ειναι ενορχιας ευνυχων. It is certain, however, Herodotus†, in relating the melancholy ſtory of Hermotimus, ſays, that παρα τοισι βαρβαροισι τα μαλιστα τιμιοι εισι οι ευνουχοι, πιστιος εινεκα πασης, των ενορχεων. "among the barbarians, the eunuchs are more valued than other men, on account of their univerſal fidelity." It appears from this paſſage of Herodotus, that in Perſia eunuchs were far from being objects of contempt; and were even frequently promoted to the higheſt honours. This was indeed the caſe with Hermotimus. We find in Agathias, who was one of the Byzantine hiſtorians, that a general in the Roman army, named *Narſes*, was a eunuch. This was in the latter ages. In Plutarch's Life of Ariſtides, Themiſtocles is related to have choſen an eunuch, whoſe name was *Arnaces*, from among his priſoners, to ſend on a ſecret embaſſy to Xerxes. This ſurely may ſerve to ſhow, that mental imbecility was not ſuppoſed by the Greeks to be the characteriſtic of eunuchiſm. The ſame ſtory of the confidence placed in Arnaces, who was one of the Perſian king's eunuchs, is related alſo in the life of Themiſtocles. Ariſtotle paid ſuch high reſpect to Hermias, who was a eunuch and governor of Atarnea, which is in Myſia, that he even offered ſacrifices in honour of him; as Lucian informs us in his Dialogue entitled *Eunuchus*. This regard of Ariſtotle for Hermias has been often celebrated, and is mentioned by Suidas, Harpocratio, and others.

EUNUCHS, in church-hiſtory, a ſect of heretics in the third century, who were mad enough to caſtrate, not only thoſe of their own perſuaſion, but even all others they could lay hold of. They took their riſe from the example of Origen, who, miſunderſtanding the following words of our Saviour, "and eunuchs who made

* Lib. vi. 32. p. 451. ed. Weſſeling.

† Lib. viii. p. 668.

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Evocati || Evolvulus.

themſelves eunuchs for the kingdom of heaven;" caſtrated himſelf.

EVOCATI, ſoldiers among the Romans, who having ſerved their full time in the army, went afterwards volunteers at the requeſt of ſome favourite general; on which account they were called by the honourable names of *Emeriti* and *Beneficiarii*.

EVOCATION (*Evocatio*,) among the Romans, a religious ceremony always obſerved by them at the undertaking a ſiege, wherein they ſolemnly called upon the gods and goddeſſes of the place to forſake it and come over to them. Without the performance of this ceremony, they either thought that the place could not be taken, or that it would be a ſacrilege to take the gods priſoners. They always took it for granted that their prayer was heard, and that the gods had deſerted the place and come over to them, provided they were able to make themſelves maſters of it.

EUODIA, in botany: A genus of the monogynia order, belonging to the tetrandria claſs of plants. The calyx is a tetraphyllous perianthium; the corolla conſiſts of four ſpathulated, ſharp, and open petals; the ſtamina are four ſubulated filaments as long as the petals; the pericarpium four, roundiſh, bivalve, and monoſpermous capſules; the ſeeds ſolitary.

EVOLUTION, in algebra, the unfolding or opening of a curve, and making it deſcribe an evolvent. The word *evolutio* is formed of the prepoſition *e* "out;" and *volvo* "I roll, or wind;" q. d. an *unwinding*, or *unrolling*.

The equable evolution of the periphery of a circle, or other curve, is ſuch a gradual approach of the circumference to rectitude, as that its parts do all concur and equally evolve or unbend; ſo that the ſame line becomes ſucceſſively a leſs arc of a reciprocally greater circle; till at laſt they change into a ſtraight line. In the Philoſophical Tranſactions, N° 260. a new quadratrix to the circle is found by this means, being the curve deſcribed by the equable evolution of its periphery.

EVOLUTION, is alſo uſed for the extraction of roots out of powers; in which ſenſe it ſtands oppoſed to involution. See ALGEBRA, p. 413.

EVOLUTION, in the art of war, the motion made by a body of troops, when they are obliged to change their form and diſpoſition, in order to preſerve a poſt or occupy another, to attack an enemy with more advantage, or to be in a condition of defending themſelves the better.

It conſiſts in doublings, counter-marches, converſions, &c. A battalion doubles the ranks, when attacked in front or rear, to prevent its being flanked or ſurrounded; for then a battalion fights with a larger front. The files are doubled, either to accommodate themſelves to the neceſſity of a narrow ground, or to reſiſt an enemy that attacks them in flank. But if the ground will allow it, converſion is much preferable; becauſe, after converſion, the battalion is in its firſt form, and oppoſes the file-leaders, which are generally the beſt men, to the enemy; and likewiſe, becauſe doubling the files in a new or not well-diſciplined regiment, they may happen to fall into diſorder. See DOUBLING.

EVOLVULUS, in botany: A genus of the tetragynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 29th order, *Campanaceæ*. The calyx is pentaphyllous; the corolla quinquefid and verticillated; the capſule trilocular; the ſeeds ſolitary.

Euonymus Eupatridæ.

EUONYMUS, the SPINDLE-TREE: A genus of the monogynia order, belonging to the pentandria claſs of plants; and in the natural method ranking under the 43d order, *Dumoſæ*. The corolla is pentapetalous; the capſule pentagonal, quinquelocular, quinquevalved, and coloured; the ſeeds hooded. There are two ſpecies, 1. The europæus, hath an upright woody ſtem 10 or 15 feet high, garniſhed with oblong oppoſite leaves: from the ſides of the branches proceed ſmall bunches of greeniſh quadrifid flowers, ſucceeded by pentagonous capſules, diſcloſing their ſeeds in a beautiful manner in autumn. 2. The americanus, or evergreen ſpindle-tree, hath a ſhrubby ſtem, dividing into many oppoſite branches, riſing ſix or eight feet high, garniſhed with ſpear-ſhaped evergreen leaves growing oppoſite, and from the ſides and ends of the branches. The flowers are quinquefid and whitiſh, and come out in ſmall bunches, ſucceeded by roundiſh, rough, and protuberant capſules, which rarely perfect their ſeeds in this country. Both theſe ſpecies are hardy, and will ſucceed in any ſoil or ſituation. The berries of the firſt ſort vomit and purge very violently, and are fatal to ſheep. If powdered and ſprinkled upon hair, they deſtroy lice. If the wood is cut when the plant is in bloſſom, it is tough and not eaſily broken; and in that ſtate it is uſed by watchmakers for cleaning watches, and for making ſkewers and tooth-pickers. Cows, goats, and ſheep, eat this plant; horſes refuſe it.

EUPATORIUM, HEMP-AGRIMONY: A genus of the polygamia æqualis order, belonging to the ſyngeneſia claſs of plants; and in the natural method ranking under the 49th order, *Compoſitæ*. The receptacle is naked; the pappus feathery; the calyx imbricated and oblong; the ſtyle ſemibifid and long. There are 13 ſpecies, many of them herbaceous flowery perennials, producing annual ſtalks from two to three or five feet high, terminated by cluſters of compound flowers of a red, purple, or white, colour. They are eaſily propagated by ſeeds, or parting the roots in autumn or ſpring. One ſpecies, viz. the cannabinum, or water hemp-agrimony, is a native of Britain. It is found wild by the ſides of rivers and ditches, and has pale-red bloſſoms. It has an acrid ſmell, and a very bitter taſte, with a conſiderable ſhare of pungency. The leaves are much recommended for ſtrengthening the tone of the viſcera, and as an aperient; and ſaid to have excellent effects in the dropſy, jaundice, cachexies, and ſcorbutic diſorders. Boerhaave informs us, that this is the common medicine of the turf-diggers in Holland, againſt ſcurvies, foul ulcers, and ſwellings in the feet, to which they are ſubject. The root of this plant is ſaid to operate as a ſtrong cathartic: but it is hardly uſed in Britain, and has no place in our pharmacopœias.

EUPATRIDÆ, in antiquity, a name given by Theſeus to the nobility of Athens, as diſtinguiſhed from the Geomori and Demiurgi. The Eupatridæ, by Theſeus's eſtabliſhment, had the right of chooſing magiſtrates, teaching and diſpenſing the laws, and interpreting holy and religious myſteries. The whole city, in all other matters, was reduced to an equality. The Geomori were huſbandmen, and inferior to the Eupatridæ,

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Plate CLXXXVII.

Euphorbia.

Fig. 1.

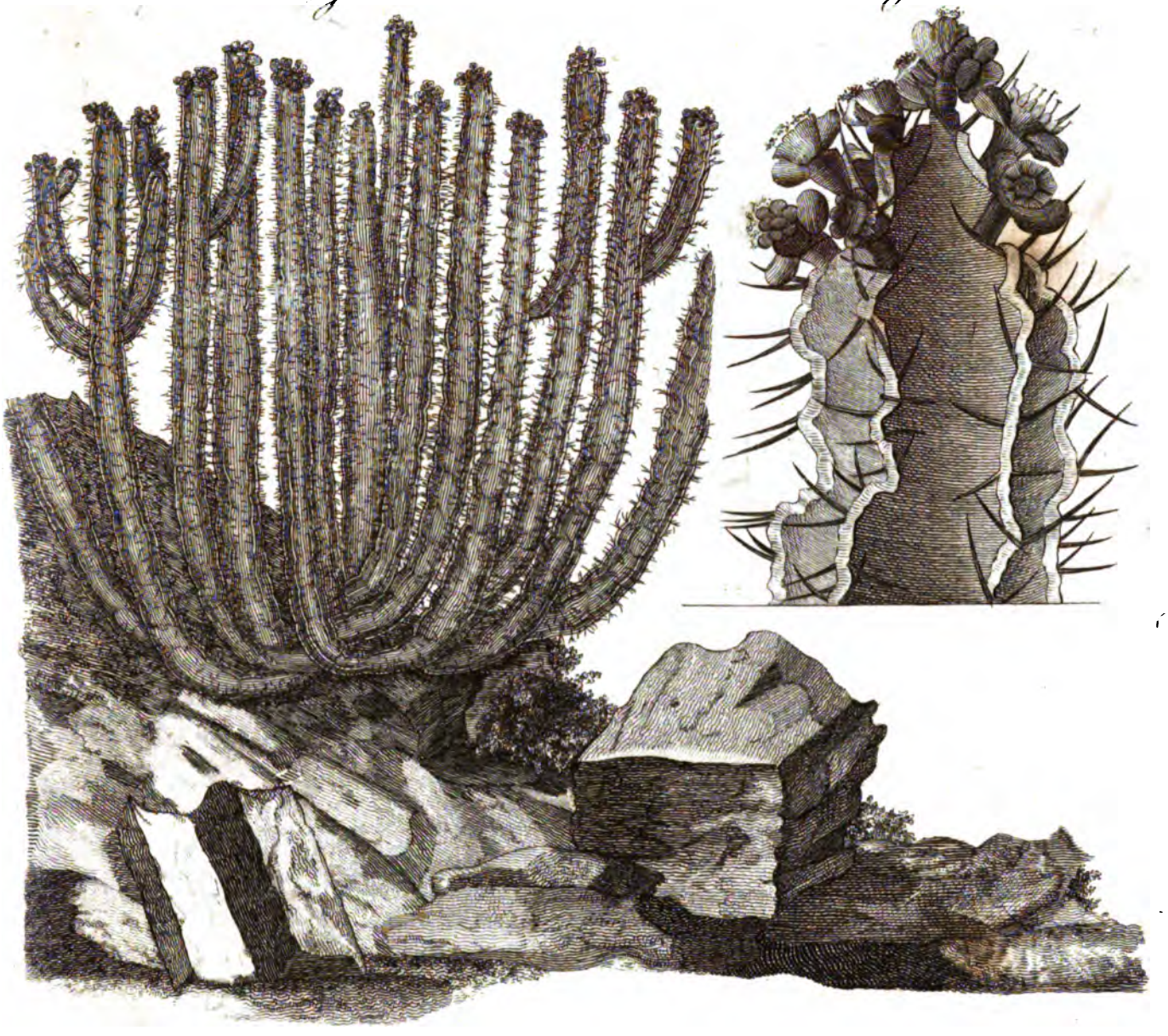
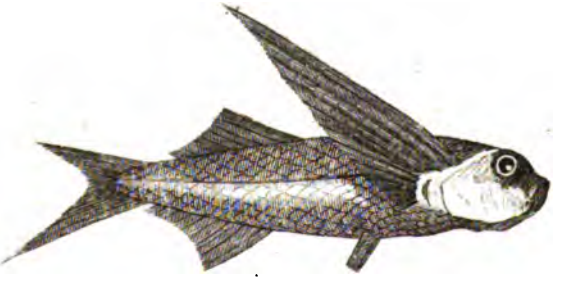


Fig. 2.

Fig. 3.

Exocœtus, the Flying Fish.



A. Bell Prin. Wal. Sculptor fecit.

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Euphony ‖ Euphorbia.

tridæ in point of fortune; the Demiurgi were artificers, and fell ſhort of the Eupatridæ in number.

EUPHONY, in grammar, an eaſineſs, ſmoothneſs, and elegancy of pronunciation. The word is formed of εὖ, *bene*, "well," and φωνὴ, *vox*, "voice." Quintilian calls *euphonia*, "*vocalitas*;" Scaglier, "*facilis pronunciatio*."

Euphonia is properly a kind of figure whereby we ſuppreſs a too harſh letter, or convert it into a ſmoother, contrary to the ordinary rules. There are examples enough in all languages.

EUPHYMISM. See ORATORY.

EUPHORBIA, SPURGE: A genus of the trigynia order, belonging to the dodecandria claſs of plants; and in the natural method ranking under the 38th order, *Tricoccæ*. The corolla is tetrapetalous or pentapetalous, placed on the calyx; the calyx is monophyllous and ventricoſe; the capſule tricoccous. There are 62 ſpecies, ſix of which are natives of Great Britain. They are moſtly ſhrubby and herbaceous ſucculents, frequently armed with thorns, having ſtalks from 10 or 12 inches to as many feet in height, with quadripetalous flowers of a whitiſh or yellow colour. They are eaſily propagated by cuttings; but the foreign kinds muſt be always kept in pots in a ſtove. If kept dry, they may be preſerved for ſeveral months out of the ground, and then planted, when they will as readily take root as though they had been freſh. The juice of all the ſpecies is ſo acrid, that it corrodes and ulcerates the body wherever it is applied; ſo that phyſicians have ſeldom ventured to preſcribe it internally. Warts, or corns, anointed with the juice, preſently diſappear. A drop of it put into the hollow of an aching tooth, gives relief, like other corroſives, by deſtroying the nerve. Some people rub it behind the ears, that it may bliſter. One of the foreign ſpecies, named *eſula*, is ſuch a violent corroſive, that, if applied to any part of the body, it produces a violent inflammation, which is ſoon ſucceeded by a ſwelling that degenerates into a gangrene and proves mortal. There is a ſpecies at the Cape, which ſupplies the Hottentots with an ingredient for poiſoning their arrows. Their method of making this pernicious mixture, is by firſt taking the juice extracted from the Euphorbia, and a kind of caterpillar peculiar to another plant which has much the appearance of a ſpecies of rhus. They mix the animal and vegetable matter; and after drying it, they point their arrows with this compoſition, which is ſuppoſed to be the moſt effectual poiſon of the whole country. The euphorbia itſelf is alſo uſed for this purpoſe, by throwing the branches into fountains of water frequented by wild beaſts, which after drinking the water thus poiſoned, ſeldom get 1000 yards from the brink of the fountain before they fall down and expire. This plant grows from about 15 to 20 feet in height, ſending out many branches full of ſtrong ſpines. The natives cut off as many of the branches as they think neceſſary for the deſtruction of the animals they intend to poiſon. They generally conduct the water a few yards from the ſpring into a pit made for the purpoſe; after which they put in the euphorbia, and cover the ſpring, ſo that the creatures have no choice. No animal eſcapes which drinks of ſuch water, though the fleſh is not injured by the poiſon.

See Plate CLXXVII. fig. 1.—Fig. 2. repreſent part of the ſtem and flowers magnified.

Paterſon's Journey to the Cape, p. 62.

EUPHORBIUM, in the materia medica, a gummi-reſinous ſubſtance, which exſudes from a large oriental tree, (EUPHORBIA *officinarum*). It is brought to us immediately from Barbary, in drops of an irregular form; ſome of which, upon being broken, are found to contain little thorns, ſmall twigs, flowers, and other vegetable matters; others are hollow, without any thing in their cavity: the tears in general are of a pale yellow colour externally, ſomewhat white within ſide: they eaſily break between the fingers. Lightly applied to the tongue, they affect it with a very ſharp biting taſte; and upon being held for ſome time in the mouth, prove vehemently acrimonious, inflaming and exulcerating the fauces, &c. Euphorbium is extremely troubleſome to pulveriſe; the finer part of the powder, which flies off, affecting the head in a violent manner. The acrimony of this ſubſtance is ſo great as to render it abſolutely unfit for any internal uſe: ſeveral correctors have been contrived to abate its virulence; but the beſt of them are not to be truſted to: and as there ſeems to be no real occaſion for it, unleſs for ſome external purpoſes, we think, with Hoffman and others, that it ought to be expunged from the catalogue of internal medicines. And accordingly it has now no place in the London or Edinburgh pharmacopœias. But it is ſtill retained in moſt of the foreign ones, and is ſometimes uſed as a ſternutatory.

Euphorbium ‖ Euphrates.

EUPHORBUS, a famous Trojan, ſon of Panthöus. He was the firſt who wounded Patroclus, whom Hector killed. He periſhed by the hand of Menelaus, who hung his ſhield in the temple of Juno at Argos. Pythagoras, the founder of the doctrine of the metempſychoſis or tranſmigration of ſouls, affirmed that he had been once Euphorbus, and that his ſoul recollected many exploits which had been done while it animated that Trojan's body. As a further proof of his aſſertion, he ſhowed at firſt ſight the ſhield of Euphorbus in the temple of Juno.

EUPHORION *of* CHALCIS, a poet and hiſtorian, born in the 126th Olympiad. Suetonius ſays that Tiberius compoſed verſes in imitation of Euphorion, Rianius, and Parthenius; with whom he was charmed to ſuch a degree, that he ordered their writings and their pictures to be kept in all the public libraries, among the ancient and celebrated authors.

EUPHRASIA, EYEBRIGHT: A genus of the angioſpermia order, belonging to the didynamia claſs of plants; and in the natural method ranking under the 40th order, *Perſonatæ*. The calyx is quadrifid and cylindrical; the capſule bilocular, ovato-oblong; the ſhorter two antheræ, with the baſe of the one lobe terminated by a ſmall ſpine. There are ſeven ſpecies; two of which, viz. the officinalis and odontites, are natives of Britain. The firſt of theſe, which hath blue flowers, is a weak aſtringent, and was formerly much celebrated in diſorders of the eyes; but the preſent practice hath not only diſregarded its internal, but alſo its external, uſe. This plant will not grow but when ſurrounded by others taller than itſelf. Cows, horſes, goats, and ſheep, eat it; ſwine refuſe it.

EUPHRATES, a river univerſally allowed to take its riſe in Armenia Major; but in what particular ſpot, or in what direction it afterwards ſhapes its courſe, there is the greateſt diſagreement. Strabo ſays, that the

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Euphrates || Evremond.

the Euphrates rises in mount Abus, which he joins with, or accounts a part of, mount Taurus; that its beginning is on the north side of mount Taurus; and that running, first westward through Armenia, then striking off to the south, it forces its way through that mountain: and thus it rises in the south of Armenia, mount Taurus being the boundary on that side; and runs through its south part, quite to Cappadocia, conterminal with Armenia Minor; or quite to this last, or to its south limit; to reach which, it must bend its west course a little north; because the Taurus, from which it rose, lies lower, or more to the south, and almost parallel with Melitene: and that then it turns to the south, in order to break through the Taurus, and escape to Syria, and then take a new bend to Babylonia. To this account of Strabo, Pliny runs quite counter; adducing eye-witnesses, who carry the Euphrates from north to south in a right line, till it meets mount Taurus; placing the springs together with mount Abus, or Aba, which inclines to the west, to the north of Taurus. Ptolemy strikes a middle course between both, placing springs to the east, as Strabo does; whence, he says, it runs in a long course westward, before it bends south; and that it rises not from mount Taurus, but far to the north of it; and he makes it run straight west from its rise, then turn south spontaneously, without any interposing obstacle, in a manner quite different from Strabo, Mela, and others, who make the Taurus the cause of this turn. The Euphrates naturally divides into two channels, one through Babylon, and the other through Seleucia, besides the several artificial cuts made between it and the Tigris about Babylon: and these cuts or trenches are what the Psalmist calls the rivers of Babylon, on the willows of which the captives hung their harps. It is probable, that the Euphrates naturally poured into the sea at one particular mouth, before these cuts were made. A thing appearing so evident to the ancients, that Pliny has set down the distance between the mouths of the Euphrates and the Tigris: and he says, some made it 25, and others 7, miles; but that the Euphrates being for a long time back intercepted in its course by cuts, made for watering the fields, only the branch called the *Pasitigris* fell into the sea, the rest of it into the Tigris, and both together into the Persian Gulf. Overflowing the country through which it runs, at stated times of the year, like the Nile, it renders it fertile.

EUPOLIS, an Athenian comic poet, flourished about the 85th Olympiad. He took the freedom of the ancient comedy in lashing the vices of the people. He lost his life in a sea-fight between the Athenians and Lacedemonians; and his fate was so much lamented, that after his death it was enacted that no poet should serve in the wars. Some say Alcibiades put him to death for his satirical freedom.

EVREMOND (Charles de St Denis), born at St Denis le Guast in Lower Normandy in 1613, was designed for the gown, and entered on the study of the law; but he soon quitted that, and was made an ensign before he was 16. A military life did not hinder him from cultivating polite literature; and he signalized himself by his politeness and wit as much as by his bravery. The king made him a mareschal de camp, and gave him a pension of 3000 livres per annum. He served under the duke of Candale in the war of Guienne; and in Flanders, till the suspension of arms was agreed on between France and Spain: he afterwards accompanied cardinal Mazarine when he went to conclude the peace with Don Lewis de Haro, the king of Spain's first minister. He wrote, as he had promised, a long letter to the marquis de Crequi, of this negociation; in which he showed, that the cardinal had sacrificed the honour of France to his own private interest, and rallied him in a very satirical manner. This letter falling into the hands of the cardinal's creatures some time after his death, was represented as a state-crime, and he was obliged to fly to Holland. He had too many friends in England (whither he had taken a tour the year before with the count de Soissons, sent to compliment Charles II. upon his restoration) to make any long stay in Holland; and therefore passed over into England, where he was received with great respect, and admitted into intimate friendship with several persons of distinction. The king gave him a pension of 300 l. a-year. He had a great desire to return to his native country; and, after the peace of Nimeguen, wrote a letter in verse to the king of France to ask leave, but in vain. Upon the death of king Charles, he lost his pension. He did not rely much on king James, though that prince had shown himself extremely kind to him. The revolution was advantageous to him. King William, who had known him in Holland, gave him substantial marks of his favour. He died of a strangury in 1703, aged 90; and was interred in Westminster-abbey, where a monument is erected to his memory. His behaviour was engaging, his humour cheerful, and he had a strong disposition to satire: he professed the Romish religion, in which he was born; but at the bottom was certainly a freethinker. He always spoke of his disgrace with the resolution of a gentleman; and whatever strong desire he had to return to his country, he never solicited the favour with meanness: therefore, when this leave was signified to him unexpectedly in the decline of his life, he replied, that the infirmities of age did not permit him to leave a country where he lived agreeably. There have been many editions of his works: but the best is that of Amsterdam in 1726, in 5 vols 12mo, to which is prefixed his life by Doctor Des Maizeaux; who has also given an accurate English translation of them in 3 vols 8vo.

Evremond, Euripides.

EURIPIDES, one of the Greek poets who excelled in tragedy, was born about 468 B. C. in the isle of Salamis, whither his father and mother had retired a little before Xerxes entered Attica. He learnt rhetoric under Prodicus, morality under Socrates, and natural philosophy under Anaxagoras; but at 18 years of age abandoned philosophy, in order to apply himself to dramatic poetry. He used to shut himself up in a cave to compose his tragedies, which were extremely applauded by the Greeks. The Athenian army, commanded by Nicias, being defeated in Sicily, the soldiers purchased their lives and liberties by reciting the verses of Euripides; such esteem and veneration had the Sicilians for the pieces wrote by this excellent poet. Socrates, the wisest of the philosophers, set such a value upon them, that they were the only tragedies he went to see acted; and yet his performances seldom gained the prize. Euripides frequent-

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Euripus, Euroclydon

ly interſperſes through them moral ſentences, and ſevere reflections on the fair ſex; whence he was called the *Woman hater*. He was, nevertheleſs, married: but the ſcandalous lives of his two wives drew upon him the raillery of Ariſtophanes, and other comic poets; which occaſioned his retiring to the court of Archelaus, king of Macedon, where he was well received. That prince was fond of learned men, and drew them to him by his liberality. If we may believe Solinus, he made Euripides his miniſter of ſtate, and gave him other extraordinary proofs of his eſteem. He had, however, paſſed but a few years there, when an unhappy accident put an end to his life. He was walking in a wood, and, according to his uſual manner, in deep meditation; when, unfortunately happening upon Archelaus's hounds, he was by them torn in pieces. It is not certain whether his death happened by chance, or through envy of ſome of the great courtiers. However, Archelaus buried him with great magnificence; and the Athenians were ſo much afflicted at his death, that the whole city went into mourning. Of 92 tragedies which he compoſed, only 19 are remaining: the moſt valuable editions of which are thoſe of Aldus, in 1503, 8vo; of Plantin, in 1570, ſexeſimo; of Commelin, in 1597, 8vo; of Paul Stevens, in 1604, 4to; and of Joſhua Barnes, in 1694, folio.

EURIPUS, now the NEGROPONT, a canal or ſtrait which divides the iſland of Eubœa from the continent of Greece. In one place it is ſo narrow, that a galley can ſcarce paſs through it. The agitations of the Euripus were much ſpoken of by the ancients. Some ſay that the canal has a flux and reflux ſix times in 24 hours; others, that it ebbs and flows ſeven times a day; but Livy does not allow this flux and reflux to be ſo regular. Father Babin, a Jeſuit of great learning, who made many obſervations on the ſpot during his long abode in the iſland of Negropont, tells us, that the Euripus is regular in its ebbing and flowing the firſt eight days of the moon: the ſame regularity he obſerved from the 14th to the 20th day incluſive, and in the three laſt days: but in the other days of the lunar month, it is not ſo regular; for it ſometimes ebbs and flows 11, 12, 13, and 14 times in the ſpace of a natural day. In this place, as the ſtory commonly goes, Ariſtotle drowned himſelf out of chagrin, for not being able to account for ſo unuſual a motion.

EURIPUS has ſince become a general name for all ſtraits, where the water is in great motion and agitation.

The ancient circuſes had their euripi, which were no other than pits or ditches on each ſide of the courſe, into which it was very dangerous falling with their horſes and chariots as they ran races. The term *euripus* was more particularly applied by the Romans to three canals or ditches which encompaſſed the circus on three ſides, and which were filled occaſionally to repreſent naumachiæ or ſea-battles. The ſame people called their ſmaller fountains or canals in their gardens *euripuſes*; and their largeſt, as caſcades, &c. *niles*.

EUROCLYDON, (of Ευρος *eaſt-wind*, and κλυδων *wave*,) is a ſpecies of wind, of which we have an account only in Acts xvii. 14. and concerning the nature of which critics have been much divided. Bochart, Grotius, Bentley, and others, ſubſtitute another reading, ſupported by the Alexandrian MS. and the Vulgate, viz. Ευρακυλων, or *Euro-aquilo*; but Mr Bryant defends the common reading, and conſiders the *Euroclydon*, i. e. Ευρος κλυζων, as an eaſt-wind that cauſes a deep ſea or vaſt inundation. He maintains, in oppoſition to Dr Bentley's reaſoning, who ſuppoſes that the mariners in the ſhip, the voyage of which is recited in this paſſage, were Romans, that they were Greeks of Alexandria, and that the ſhip was an Alexandrian ſhip employed in the traffic of carrying corn to Italy; and therefore, that the mariners had a name in their own language for the particular typhonic or ſtormy wind here mentioned. He alſo ſhows from the paſſage itſelf, that the tempeſtuous wind called *Euroclydon*, beat (κατ' αυτης) upon the iſland of Crete; and therefore, as this is a relative expreſſion, referring to the ſituation of the perſon who ſpeaks of it, who was at that time to the windward or ſouth of it, the wind blew upon ſhore; and muſt have come from the ſouth or ſouth-eaſt; which, he adds, is fully warranted by the point where the ſhip was, and the direction it ran in afterwards, which was towards the north and north-weſt.

Europa; Europe.

EUROPA, in fab. hiſt. a daughter of Agenor king of Phœnicia and Telephaſſa. She was ſo beautiful that Jupiter became enamoured of her; and the better to ſeduce her, he aſſumed the ſhape of a bull and mingled with the herds of Agenor, while Europa, with her female attendants were gathering flowers in the meadows. Europa careſſed the beautiful animal; and at laſt had the courage to ſit upon his back. The god took advantage of her ſituation; and with precipitate ſteps retired towards the ſhore, croſſed the ſea with Europa on his back, and arrived ſafe in Crete. Here he aſſumed his original ſhape, and declared his love. The nymph conſented, though ſhe had once made vows of perpetual celibacy; and ſhe became mother of Minos, Sarpedon, and Rhadamanthus. After this diſtinguiſhed amour with Jupiter, ſhe married Aſterius king of Crete. This monarch ſeeing himſelf without children by Europa, adopted the fruit of her amours with Jupiter, and always eſteemed Minos, Sarpedon, and Rhadamanthus as his own children. Some ſuppoſe that Europa lived about 1552 years before the Chriſtian era.

EUROPE, one of the quarters of the world, bounded on the north by the Frozen Ocean, on the weſt by the Weſtern Ocean, on the ſouth by the Mediterranean, which ſeparates it from Africa, and by the Archipelago, which divides it in part from Aſia, as alſo by the Black Sea, then by the river Don, till it comes near the river Volga or Wolga, and then it is parted from Aſia by this laſt, and afterwards by the river Oby. Europe is ſituated between Long 9. 35. W. and 72. 25. E. and Lat. 35° and 72° N. It is about 3300 miles in length, from Cape St Vincent in Portugal, to the river Oby in Ruſſia; and 2200 miles in breadth, from Cape Matapan, in the Morea, to the North Cape of Norway. We may judge by this, that it is much leſs than Aſia and Africa: but it is in many things more conſiderable than both.

Europe, excepting a ſmall part of Lapland and Muſcovy, is ſituated in the temperate zone; inſomuch, that we neither feel the extremities of heat nor cold. We cannot boaſt of rich mines of gold, ſilver, and precious ſtones; nor does it produce ſugar or ſpices, nor

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Europe
||
Euryandra.

yet elephants, camels, &c. which we can do without; but produces abundance of corn, pulſe, fruits, animals, &c. the moſt neceſſary for the uſe of mankind. In general, it is better peopled and better cultivated than the other quarters; it is more full of cities, towns, and villages, great and ſmall, and its buildings are more ſolid and more commodious than thoſe of Africa and Aſia. The inhabitants are all white; and incomparably more handſome than the Africans, and even than moſt of the Aſiatics. The Europeans ſurpaſs both in arts and ſciences, eſpecially in thoſe called the *liberal*; in trade, navigation, and in military and civil affairs; being, at the ſame time, more prudent, more valiant, more generous, more polite, and more ſociable than they: and though we are divided into various ſects, yet, as Chriſtians, we have infinitely the advantage over the reſt of mankind. There are but few places in Europe where they ſell each other for ſlaves; and none where robbery is a profeſſion, as it is in Aſia and Africa.

There are ſeveral ſorts of governments in Europe; as the two empires of Germany and Ruſſia, the kingdoms of England, France, Spain, Portugal, Denmark, Sweden, Poland, Pruſſia, Sardinia, and the Two Sicilies. The commonwealths are Holland, Swiſſerland, Venice, Genoa, Raguſa, Lucca, and Geneva. The dukedoms, Tuſcany, Savoy, Modena, Mantua, Parma, and Courland, &c.

There are five ſorts of religions in Europe, viz. the Mahommedan, which is profeſſed in Turkey in Europe; the Greek, of which there are many in the ſame parts, in all Muſcovy, and in ſeveral parts of Poliſh Ruſſia; the Roman Catholic in Spain, Portugal, France, and Italy; the Proteſtant, though with a conſiderable difference, in Great Britain, Denmark, Sweden, and Norway. There is a mixture of both the laſt, in Ireland, Swiſſerland, Germany, Poland, Hungary, and the Low Countries: beſides many Jews, and ſome idolaters in Lapland and the northern parts of Muſcovy.

There are three general languages in Europe: the Latin, of which the Italian, the French, and the Spaniſh, are dialects; the Teutonic, which is ſpoken, tho' differently, in Germany, Hungary, Denmark, Sweden, and Great Britain; the Sclavonic, which is ſpoken, tho' greatly diſguiſed, in Muſcovy, Poland, Bohemia, and Turkey in Europe. There are ſome of leſs extent: as, the Greek; the Proper Hungarian; the Baſque; the Britiſh, which is ſpoken in Wales and Bretagne in France; the Iriſh; and the Laponic.

Europe may be divided into 11 great parts, including their dependencies: 1. Sweden; 2. Denmark and Norway; 3. Ruſſia; 4. Poland; 5. Germany; 6. France; 7. Spain; 8. Italy; 9. Turkey in Europe; 10. Little Tartary; and, 11. The European iſlands, of which the chief are Great Britain and Ireland. The greateſt cities in Europe are, London, Paris, Amſterdam, Conſtantinople, Muſcow, and Rome.

EURYALE, in mythology, one of the Gorgons, daughter of Phorcys, and ſiſter of Meduſa: ſhe was ſubject neither to old age nor death.

EURYANDRA, in botany; A genus of the trigynia order, belonging to the polyandria claſs of plants. The calyx is a pentaphyllous perianthium, with ſmall, roundiſh, and concave leaves; the corolla conſiſts of three roundiſh hollow petals, longer than the calyx. The ſtamina are very many capillary filaments much dilated at the apex; the pericarpium three egg-ſhaped follicles containing ſeveral ſeeds.

Eurydice
||
Euſden.

EURYDICE, in fab. hiſt. the wife of Orpheus, who, flying from Ariſtæus that endeavoured to raviſh her, was ſlain by a ſerpent. Her huſband went down to the ſhades, and by the force of his muſic perſuaded Pluto and Proſerpine to give him leave to carry back his wife; which they granted, provided he did not look on her till he came to the light; but he breaking the condition, was forced to leave her behind him. See ORPHEUS.

EURYMEDON, (anc. geog.) a noble river running through the middle of Pamphylia; famous for a ſea and land fight on the ſame day, in which the Athenians, under Cimon the ſon of Miltiades, defeated the Perſians. The ſea-fight happened firſt in the ſea of Pamphylia, towards Cyprus; the land engagement, the following night on the Eurymedon. Cimon, after defeating the Perſian fleet, armed his men with the armour of the captives, and ſet ſail for the enemy, who lay on the banks of the Eurymedon, in the ſhips taken from the Perſians; who on ſeeing their own ſhips and their own people in appearance, were off their guard, and thus became an eaſy conqueſt.

EURYSTHEUS, a king of Argos and Mycenæ, ſon of Sthenelus, and Nicippe the daughter of Pelops. Juno haſtened his birth by two months, that he might come into the world before Hercules the ſon of Alcmena, as the younger of the two was doomed by order of Jupiter to be ſubſervient to the will of the other. (*Vide* ALCMENA.) This natural right was cruelly exerciſed by Euryſtheus, who was jealous of the fame of Hercules; and who to deſtroy ſo powerful a relation, impoſed upon him the moſt dangerous and uncommon enterpriſes well known by the name of the *twelve labours of Hercules*. The ſucceſs of Hercules in atchieving thoſe perilous labours alarmed Euryſtheus in a greater degree, and he furniſhed himſelf with a brazen veſſel, where he might ſecure himſelf a ſafe retreat in caſe of danger. After the death of Hercules, Euryſtheus renewed his cruelties againſt his children, and made war againſt Ceyx king of Trachinia, becauſe he had given them ſupport, and treated them with hoſpitality. He was killed in the proſecution of this war by Hyllus the ſon of Hercules. His head was ſent to Alcmena the mother of Hercules; who, mindful of the cruelties which her ſon had ſuffered, inſulted it, and tore out the eyes with the moſt inveterate fury. Euryſtheus was ſucceeded on the throne of Argos by Atreus his nephew. The death of Euryſtheus happened about 30 years before the Trojan war.

EURYTHMY, in architecture, painting, and ſculpture, is a certain majeſty, elegance, and eaſineſs, appearing in the compoſition of divers members or parts of a body, painting, or ſculpture, and reſulting from the fine proportion of it.

EUSDEN (Laurence), an Iriſh clergyman, rector of Coneſby in Lincolnſhire, and poet laureat after the death of Mr Rowe. His firſt patron was the eminent lord Halifax; whoſe poem, on the battle of the Boyne, he tranſlated into Latin, and dedicated to his lordſhip. He was eſteemed by the duke of Newcaſtle, who rewarded an epithalamium he wrote on his marriage with the place of poet laureat. He was the author of many

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Euſebians || Euſtathians.

poetical pieces, though but little known before his preferment: he died in 1730.

EUSEBIANS, a denomination given to the ſect of Arians, on account of the favour and countenance which Euſebius, biſhop of Cæſarea, ſhowed and procured for them at their firſt riſe. See ARIANS and EUSEBIUS.

EUSEBIUS, ſurnamed PAMPHILUS, a celebrated biſhop of Cæſarea in Paleſtine, and one of the moſt learned men of his time, was born in Paleſtine about the latter end of the reign of Gallienus. He was the intimate friend of Pamphilus the Martyr; and, after his death, took his name in honour to his memory. He was ordained biſhop of Cæſarea in 313. He had a conſiderable ſhare in the conteſt relating to Arius; whoſe cauſe he, as well as ſeveral other biſhops of Paleſtine, defended, being perſuaded that Arius had been unjuſtly perſecuted by Alexander biſhop of Alexandria. He aſſiſted at the council of Nice in 325; when he made a ſpeech to the emperor Conſtantine on his coming to the council, and was placed next him on his right hand. He was preſent at the council of Antioch, in which Euſtathius biſhop of that city was depoſed; but though he was choſen by the biſhop and people of Antioch to ſucceed him, he abſolutely refuſed it. In 335, he aſſiſted at the council of Tyre held againſt Anathaſius; and at the aſſembly of biſhops at Jeruſalem, at the time of the dedication of the church there. By theſe biſhops he was ſent to the emperor Conſtantine to defend what they had done againſt Athanaſius; when he pronounced the panegyric made on that emperor during the public rejoicings in the beginning of the 30th year of his reign, which was the laſt of his life. Euſebius ſurvived the emperor but a ſhort time, for he died in 338. He wrote, 1. An Eccleſiaſtical Hiſtory, of which Valeſius has given a good edition in Greek and Latin; 2. The life of Conſtantine; 3. A treatiſe againſt Hierocles; 4. *Chronicon*; 5. *Præparationes Evangelicæ*; 6. *De demonſtratione Evangelica*; of which there are but 10 books extant out of 20; and ſeveral other works, ſome of which are loſt.

EUSTACHIUS (Bartholomew), phyſician and anatomiſt at Rome, flouriſhed about the year 1550. His anatomical Plates were diſcovered there in 1712, and publiſhed in 1714.

EUSTATHIANS, a name given to the Catholics of Antioch in the 4th century, on occaſion of their refuſal to acknowledge any other biſhop beſide St Euſtathius, depoſed by the Arians.

The denomination was given them during the epiſcopate of Paulinus, whom the Arians ſubſtituted to St Euſtathius, about the year 330, when they began to hold their aſſemblies apart. About the year 350, Leontius of Phrygia, called the *eunuch*, who was an Arian, and was put in the ſee of Antioch, deſired the Euſtathians to perform their ſervice in his church; which they accepting, the church of Antioch ſerved indifferently both the Arians and Catholics.

This, we are told, gave occaſion to two inſtitutions, which have ſubſiſted in the church ever ſince. The firſt was pſalmody in two choirs; though M. Baillet thinks, that if they inſtituted an alternate pſalmody between two choirs, it was between two Catholic choirs, and not by way of reſponſe to an Arian choir. The ſecond was the doxology, *Glory be to the Father, and the Son, and the Holy Ghoſt.* See DOXOLOGY.

Euſtathians || Euſtatia.

This conduct, which ſeemed to imply a kind of communion with the Arians, gave great offence to abundance of Catholics, who began to hold ſeparate meetings; and thus formed the ſchiſm of Antioch. Upon this, the reſt, who continued to meet in the church, ceaſed to be called *Euſtathians*, and that appellation became reſtrained to the diſſenting party. S. Flavianus, biſhop of Antioch in 381, and one of his ſucceſſors, Alexander, in 482, brought to paſs a coalition, or reunion, between the Euſtathians and the body of the church of Antioch, deſcribed with much ſolemnity by Theodoret, *Eccl.* l. iii. c. 2.

EUSTATHIANS were alſo a ſect of heretics in the fourth century, denominated from their founder Euſtathius, a monk ſo fooliſhly fond of his own profeſſion, that he condemned all other conditions of life. Whether this Euſtathius was the ſame with the biſhop of Sebaſtia and chief of the Semiarians, is not eaſy to determine.

He excluded married people from ſalvation; prohibited his followers from praying in their houſes; and obliged them to quit all they had, as incompatible with the hopes of heaven. He drew them out of the other aſſemblies of Chriſtians to hold ſecret ones with him, and made them wear a particular habit: he appointed them to faſt on Sundays; and taught them, that the ordinary faſts of the church were needleſs, after they had attained to a certain degree of purity which he pretended to. He ſhowed great horror for chapels built in honour of martyrs, and the aſſemblies held therein. Several women, ſeduced by his reaſons, forſook their huſbands, and abundance of ſlaves deſerted their maſters houſes. He was condemned at the council of Gangra in Paphlagonia, held between the years 326 and 341.

EUSTATHIUS, biſhop of Theſſalonica, in the 12th century, under the reigns of the emperors Emanuel, Alexander, and Andronicus Comnenus. He was a very eminent grammarian; and wrote commentaries upon Homer, and Dionyſius the geographer. The beſt edition of his Commentaries on Homer is that of Rome, printed in Greek, in 1542, in four volumes folio. His commentaries on the Periegeſis of Dionyſius were printed by Mr Hudſon at Oxford, in 1697, 8vo. Euſtathius appears to have been alive in the year 1194.

EUSTATIA, ST EUSTATIA, or *Euſtatius*, one of the Caribbee iſlands, belonging to the Dutch, and ſituated in W. Long. 62. 56. N. Lat. 17. 29. It is little elſe than a huge mountain, which formerly has, in all probability, been a volcano. Its ſituation is ſo ſtrong, that it has but one landing place; and that is fortified in ſuch a manner as to be almoſt impregnable. Tobacco is the chief product of the iſland; and it is cultivated to the very top of the pyramid, which terminates in a large plain ſurrounded with woods, but having a hollow in the middle, which ſerves as a large den for wild beaſts. No fewer than 5000 white people and 15,000 negroes ſubſiſt on this ſpot, where they rear hogs, kids, rabbits, and all kinds of poultry, in ſuch abundance, that they can ſupply their neighbours, after having ſerved themſelves.

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Euſtatia. The firſt Dutch colony ſent to this iſland conſiſted of about 1600 people. They were diſpoſſeſſed by the Engliſh from Jamaica in 1665. Soon after, the Dutch and French becoming confederates, the Engliſh were expelled in their turn. The French continued to hold a garriſon in the iſland till the treaty of Breda, when it was reſtored to the Dutch. Soon after the revolution, the French drove out the Dutch, and were in their turn driven out by the Engliſh under Sir Timothy Thornhill, with the loſs of no more than eight men killed and wounded, though the fort they took mounted 16 guns and was in every other reſpect very ſtrong. Sir Timothy found it neceſſary for the protection of the Dutch, to leave a ſmall Engliſh garriſon in the fort; but he granted the French no terms of capitulation, except for their lives and baggage. By the peace of Ryſwic, the entire property of this iſland was reſtored to the Dutch.

This iſland was reduced by the Britiſh in the year 1781. Though not 20 miles in circumference, it abounded at that time with riches, by reaſon of the vaſt conflux of trade from every other iſland in theſe ſeas. Being a free port, it was open to all the ſubjects of the belligerent powers; and thus a communication was eſtabliſhed among them, through which they were enabled to carry on a commercial correſpondence, which greatly mitigated the inconveniences of war. The greateſt benefit, however, was reaped by the Dutch; who, by tranſacting all trading buſineſs for other nations, were thus entruſted with numberleſs commiſſions, and likewiſe enjoyed vaſt profits from the ſale of the merchandizes to which they were intitled. At the time the attack was made upon them, they were ſo little under any apprehenſions of ſuch an event, that their ware-houſes were not ſufficient to contain the quantity of commercial articles imported for ſale, and the beach and ſtreets were covered with hogſheads of tobacco and ſugar. In this ſituation, Admiral Rodney having received orders to commence hoſtilities againſt the Dutch, ſuddenly appeared before the iſland with ſuch an armament of ſea and land forces, as in its defenceleſs ſituation was not only uſeleſs but ridiculous. The governor could ſcarce credit the officer who ſummoned him to ſurrender; but being convinced how matters ſtood, the only poſſible ſtep was taken, namely, to ſurrender the whole iſland, and every thing in it, at diſcretion. Along with the iſland there fell into the hands of the captors a ſhip of 60 guns, with 250 ſail of merchantmen, while the value of property on the iſland was eſtimated at no leſs than four millions ſterling. This capture became afterwards a ſubject of diſcuſſion in parliament, where the conduct of the Britiſh commanders was ſeverely ſcrutinized by Mr Burke. The admiral and general made their defence in perſon; but the minority at that time were far from being ſatisfied; and it was ſuppoſed that on the change of miniſtry a rigid inquiry would have been ſet on foot, had not the ſplendor of Admiral Rodney's victory over de Graſſe put an end to all thoughts of that nature.

The iſland of St Euſtatius is naturally of ſuch difficult acceſs, as already obſerved, that it is almoſt impoſſible for an enemy to effect a landing if proper care is taken by thoſe who are in poſſeſſion of it. This very circumſtance proved the ruin of the new poſſeſſors. The Britiſh, ſecure in their inacceſſible ſituation, conducted themſelves in ſuch a manner as induced the Marquis de Bouille to make an attempt to regain it. Having ſailed from Martinico at the head of 2000 men, he arrived, on the 26th of November 1781, off one of the landing places of the iſland, which was deemed ſo inacceſſible that it had been left without a guard. With much loſs and difficulty, however, he landed here with four or five hundred of his people during the night. The appearance of day put an end to his landing any more; and he now ſaw himſelf obliged either to relinquiſh the enterpriſe or to attack the garriſon, which was almoſt double the number of thoſe he had on the iſland. He choſe the latter; and was favoured in his enterpriſe by the extreme negligence of his antagoniſts. A difficult paſs, which a few men might have occupied with ſucceſs againſt a great number, was left unguarded, which the marquis ſecured in time, and then puſhed forward with the utmoſt expedition. The Britiſh, miſtaking a body of Iriſh troops which attended the French commander for their own comrades, ſuffered them to approach without thinking of oppoſing them. They were then exerciſing on the parade; but were ſoon made ſenſible of their fatal miſtake by a cloſe diſcharge from their ſuppoſed friends, by which many were killed and wounded. The ſurpriſe occaſioned by this ſudden attack was ſo great, that no reſiſtance could be made; eſpecially as their commanding officer, colonel Cockburn, who happened at that inſtant to come upon the parade, was made priſoner. A number of them, however, haſtened to the fort with a view of making head againſt the enemy; but the French had already taken poſſeſſion of the gate, and prevented the draw-bridge from being raiſed. They entered the fort; which, being ſurrendered by thoſe who had taken ſhelter in it, the reſt of the garriſon, diſperſed in various places, and imagining the number of the enemy to be much greater than it really was, ſubmitted without any oppoſition. The French commander took this opportunity of ſhowing his diſintereſtedneſs in pecuniary matters. Among the ſpoils that fell into his hands a large ſum of money was claimed by the Britiſh commanding officer as being his private property, which was generouſly reſtored to him: in like manner the property of the Dutch inhabitants was reſerved to them, and nothing was allowed to be ſeized but the produce ariſing from the ſale of prizes that had been taken by the Engliſh when they captured the iſland.

Euſtatius || Euthymia.

EUSTYLE, in architecture, a ſort of building in which the pillars are placed at the moſt convenient diſtance one from another, the intercolumniations being juſt two diameters and a quarter of the column, except thoſe in the middle of the face, before and behind, which are three diameters diſtant.

EUTERPE, one of the muſes, daughter of Jupiter and Mnemoſyne. She preſided over muſic, and was looked upon as the inventreſs of the flute. She is repreſented as crowned with flowers and holding a flute in her hands: Some mythologiſts attributed to her the invention of tragedy, more commonly ſuppoſed to be the production of Melpomene.

EUTHYMIA, among the Greeks, ſignified ſuch a diſpoſition, or ſtate of the mind, as could not be ruffled either by good or bad fortune, by ſickneſs or health, good or evil.

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Eutropius || Eutychians.

EUTROPIUS (Flavius), a Latin author, in the 4th century, was ſecretary to Conſtantine the Great, and afterwards bore arms under the emperor Julian, and followed that prince in his expedition againſt the Perſians. He wrote an Abridgment of the Roman Hiſtory, from the foundation of Rome to the reign of Valens; the beſt edition of which is that of Miſs Le Fevre, afterwards Madam Dacier, publiſhed at Paris for the uſe of the Dauphin, in 4to, in the year 1683.

EUTYCHIANS, ancient heretics, who denied the duplicity of natures in Chriſt; thus denominated from Eutyches, the archimandrite, or abbot of a monaſtery at Conſtantinople, who began to propagate his opinion A. D. 448. He did not, however, ſeem quite ſteady and conſiſtent in his ſentiments: for he appeared to allow of two natures, even before the union; which was apparently a conſequence he drew from the principles of the Platonic philoſophy, which ſuppoſes a pre-exiſtence of ſouls: accordingly, he believed that the ſoul of Jeſus Chriſt had been united to the divinity before the incarnation; but then he allowed no diſtinction of natures in Jeſus Chriſt ſince his incarnation. This hereſy was firſt condemned in a ſynod held at Conſtantinople by Flavian, in 448, approved by the council of Epheſus, called *conventus latronum*, in 449, and re-examined, and fulminated, in the general council of Chalcedon in 451. The legates of pope Leo, who aſſiſted at it, maintained, that it was not enough to define, that there were two natures in Jeſus Chriſt, but inſiſted ſtrenuouſly, that, to remove all equivocations, they muſt add theſe terms, without being changed, or confounded, or divided.

The hereſy of the Eutychians, which made a very great progreſs throughout the eaſt, at length became divided into ſeveral branches. Nicephorus makes mention of no fewer than twelve: ſome called *Schematici*, or *Apparentes*, as only attributing to Jeſus Chriſt a phantom or appearance of fleſh, and no real fleſh: others, *Theodoſians*, from Theodoſius biſhop of Alexandria: others, *Jacobites*, from one James (*Jacobus*), of Syria; which branch eſtabliſhed itſelf principally in Armenia, where it ſtill ſubſiſts. Others were called *Acephali*, *q. d* without head; and *Severians*, from a monk called *Severus*, who ſeized on the ſee of Antioch in 513. Theſe laſt were ſubdivided into five factions, *viz. Ignoetæ*, who attributed ſome ignorance to Jeſus Chriſt; the followers of Paul; Μελαῖται, that is, the black *Angelites*; thus called from the place where they were aſſembled; and laſtly, *Adrites*, and *Cononites*.

EUTYCHIANS was alſo the name of another ſect, half Arian half Eunomian; which aroſe at Conſtantinople in the fourth century.

It being then a matter of mighty controverſy among the Eunomians at Conſtantinople, whether or no the Son of God knew the laſt day and hour of the world, particularly with regard to that paſſage in the goſpel of St Matthew, chap. xxiv. ver. 36. or rather that in St Mark, xiii. 32. where it is expreſſed, that the Son did not know it, but the Father only; Eutychius made no ſcruple to maintain, even in writing, that the Son did not know it; which ſentiment diſpleaſing the leaders of the Eunomian party, he ſeparated from them, and made a journey to Eunomius, who was then in exile.—That heretic acquieſced fully in Eutychius's doctrine, and admitted him to his communion. Eunomius dying ſoon after, the chief of the Eunomians at Conſtantinople refuſed to admit Eutychius; who, upon this, formed a particular ſect of ſuch as adhered to him, called *Eutychians*. Eutychius || Ex.

This ſame Eutychius, with one Theopronius, as was ſaid in Sozomen's time, were the occaſions of all the changes made by the Eunomians in the adminiſtration of baptiſm; which conſiſted, according to Nicephorus, in only uſing one immerſion, and not doing it in the name of the Trinity, but in memory of the death of Jeſus Chriſt. Nicephorus calls the chief of that ſect, not *Eutychius*, but *Eupſychius*, and his followers *Eunomiaupſychians*.

EUTYCHIUS, patriarch of Alexandria, lived about the ninth age; and wrote annals in the Arabic language, printed at Oxford in 1658, with a Latin verſion by Mr Pocock. Selden had printed ſomething of his before.

EUXINE or BLACK SEA, forms part of the boundary betwixt Europe and Aſia. It receives the Nieper, the Danube, and other large rivers; and extends from 28 to 40 degrees of E. Long, and from 40 to 46 of N. Lat. The ancients imagined this ſea to have been originally only a lake or ſtanding pool, which broke firſt into the Propontis, and then into the Egean, waſhing away by degrees the earth which firſt kept it within bounds, and formed the two channels of the Boſphorus Thracius and Helleſpont, now the Dardanelles.—It was anciently called the *Axenus*, ſuppoſed to be from Aſhkenaz the ſon of Gomer, who is ſaid to have ſettled near it. This original being forgot in length of time, the Greeks explained it by *inhoſpitable*, which the word Axenos literally ſignifies; and therefore, when they came to conſider the inhabitants of theſe coaſts as more civilized and hoſpitable, they changed the name into Euxinus, which it ſtill retains.

EWE, the Engliſh name of a female ſheep. See OVIS.

EWERY, in the Britiſh cuſtoms, an office in the king's houſhold, to which belongs the care of the table linen, of laying the cloth, and ſerving up water in ſilver ewers after dinner.

EX, a river that riſes in a barren tract of land, called Exmore, in Somerſetſhire; and after being joined by ſeveral little ſtreams, runs by Tiverton, where there is a ſtone bridge over the river. About nine miles below Tiverton, it is joined by a pretty large ſtream called the *Colombton*; and about two miles lower, by another ſtream formed by the junction of the Horton and Credy. With theſe additions, it waſhes the walls of Exeter. At Topſham, above four miles below Exeter, it receives another conſiderable addition to its ſtream; two miles farther, it is joined by the Ken; and falls into the ocean at Exmouth, after a courſe of about 40 miles. Ships of great burden go up to Topſham, from whence veſſels of 150 tons are conveyed to the quay at Exeter, by means of an artificial canal. The Ex is navigable for veſſels of conſiderable burden to Topſham. The paſſage, however, at the mouth of the river, is but narrow, having rocks on the eaſt-ſide and broad ſands on the weſt; nor is the water on the bar more than ſix or ſeven feet deep at low water, but the tide riſes 14 or 15 feet, ſo that it is deep enough at high water. When ſhips are within the

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Ex officio ‖ Exaltation

bar, they may ride afloat at a place called Starcroſs, about a mile and an half from the river's mouth; but thoſe that go to Topſham lie a-ground on the ooze at low water.

EX OFFICIO, among lawyers, ſignifies the power a perſon has, by virtue of his office, to do certain acts without being applied to. Thus a juſtice of peace may *ex officio*, at his diſcretion, take ſurety of the peace, without complaint made by any perſon whatſoever.

There was formerly an oath *ex officio*, whereby a ſuppoſed offender was compelled in the eccleſiaſtical court to confeſs, accuſe, or clear himſelf of a crime; but this law is repealed.

Ex Poſt Facto, in law, ſomething done after another: thus an eſtate granted may be good by matter *ex poſt facto*, that was not ſo at firſt, as in caſe of election.

EXACERBATION. See PAROXYSM.

EXACTION, in law, a wrong done by an officer, or a perſon in pretended authority, in taking a reward or fee that is not allowed by law.

A perſon guilty of exaction may be fined and impriſoned. It is often confounded with EXTORTION.

EXACUM, in botany: A genus of the monogynia order, belonging to the tetrandria claſs of plants; and in the natural method ranking under the 20th order, *Rotaceæ*. The calyx is tetraphyllous; the corolla quadrifid, with the tube globular; the capſule two-furrowed, bilocular, polyſpermous, and opening at the top.

EXÆRESIS, in ſurgery, the operation of extracting or taking away ſomething that is hurtful to the human body.

EXAGGERATION, in rhetoric, a kind of hyperbole, whereby things are augmented or amplified, by ſaying more than the truth, either as to good or bad.

EXAGGERATION, in painting, a method by which the artiſt, in repreſenting things, changes them too much, or makes them too ſtrong, either in reſpect of the deſign or colouring. It differs from *caricaturing*, in that the latter perverts or gives a turn to the features of a face, &c. which they had not; whereas exaggeration only heightens or improves what they had.

EXALTATION, or ELEVATION, is chiefly uſed in a figurative ſenſe, for the raiſing or advancing a perſon to ſome eccleſiaſtical dignity; and particularly to the papacy.

EXALTATION of the Croſs, is a feaſt of the Romiſh church, held on the 14th of September; in memory, as is generally ſuppoſed, of this, that the emperor Heraclius brought back the true croſs of Jeſus Chriſt on his ſhoulders, to the place on mount Calvary, from which it had been carried away 14 years before by Coſroes king of Perſia, at his taking of Jeruſalem, under the reign of the emperor Phocas. The croſs was delivered up by a treaty of peace made with Siroe, Coſroe's ſon. The inſtitution of this treaty is commonly ſaid to have been ſignalized by a miracle; in that Heraclius could not ſtir out of Jeruſalem with the croſs, while he had the imperial veſtments on enriched with gold and precious ſtones, but bore it with eaſe in a common dreſs.

But long before the empire of Heraclius, there had been a feaſt of the ſame denomination obſerved both in the Greek and Latin churches, on occaſion of what our Saviour ſaid in St John xii. 32. *And I, if I be exalted, or lifted up, will draw all men unto me.* And again, in ch. viii. ver. 28. *When you have* exalted, *or lifted up, the Son of Man, then ſhall ye know that I am he.*

Exaltation ‖ Example.

The feaſt of the dedication of the temple built by Conſtantine was held, ſays Nicephorus, on the 14th of September, the day on which the temple had been conſecrated, in the year 335; and this feaſt was alſo called the *exaltation of the croſs*, becauſe it was a ceremony therein, for the biſhop of Jeruſalem to aſcend a high place, built by Conſtantine for that purpoſe, in manner of a pulpit, called by the Greeks the *ſacred myſteries of God*, or *the holineſs of God*, and there hoiſt up the croſs, for all the people to ſee it.

EXALTATION, in phyſics, denotes the act, or operation, of elevating, purifying, ſubtilizing, or perfecting, any natural body, its principles and parts; alſo the quality or diſpoſition which bodies acquire by ſuch operation. The term *exaltation* has been peculiarly affected by the chemiſts and alchemiſts; who, imagining it to have ſome extraordinary emphaſis, are employing it on every occaſion.

EXALTATION, in aſtrology, is a dignity which a planet acquires in certain ſigns or parts of the zodiac; which dignity is ſuppoſed to give it an extraordinary virtue, efficacy, and influence. The oppoſite ſign, or part of the zodiac, is called the dejection of the planet. Thus the 15th degree of Cancer is the exaltation of Jupiter, according to Albumazor, becauſe it was the aſcendant of that planet at the time of the creation; that of the ſun is in the 19th degree of Aries, and its dejection in Libra; that of the moon is in Taurus, &c. Ptolemy gives the reaſon of this in his firſt book De Quadrup.

EXAMINATION, an exact and careful ſearch or inquiry, in order to diſcover the truth or falſehood of a thing.

Self-EXAMINATION is a point much inſiſted on by divines, and particularly the ancient fathers, by way of preparation to repentance. St Ignatius reduces it to five points; viz. 1. A returning thanks to God for his benefits. 2. A begging of grace and light, to know and diſtinguiſh our ſins. 3. A running over all our actions, occupations, thoughts, and words, in order to learn what has been offenſive to God. 4. A begging of pardon, and conceiving a ſincere ſorrow for having diſpleaſed him. And, 5. Making a firm reſolution not to offend him any more; and taking the neceſſary precautions to preſerve ourſelves from it.

EXAMINERS, in chancery, two officers of that court, who examine, upon oath, witneſſes produced in cauſes depending there, by either the complainant or defendant, where the witneſſes live in London or near it. Sometimes parties themſelves, by particular order, are examined. In the country, above 20 miles from London, on the parties joining in commiſſion, witneſſes are examined by commiſſioners, being uſually counſellors or attornies not concerned in the cauſe.

EXAMPLE, in a general ſenſe, denotes a copy or pattern.

EXAMPLE, in a moral ſenſe, is either taken for a type, inſtance, or precedent, for our admonition, that we may be cautioned againſt the faults or crimes which

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Example ‖ Exarch.

others have committed, by the bad conſequences which have enſued from them; or example is taken for a pattern for our imitation or a model for us to copy after.

That examples have a peculiar power above the naked precept, to diſpoſe us to the practice of virtue and holineſs, may appear, by conſidering, 1. That they moſt clearly expreſs to us the nature of our duties in their ſubjects and ſenſible effects. General precepts form abſtract ideas of virtue; but in examples, virtues are moſt viſible in all their circumſtances. 2. Precepts inſtruct us in what things are our duty; but examples aſſure us that they are poſſible. When we ſee men like ourſelves, who are united to frail fleſh, and in the ſame condition with us, to command their paſſions, to overcome the moſt glorious and glittering temptations, we are encouraged in our ſpiritual warfare. 3. Examples, by ſecret and lively incentive, urge us to imitation. We are touched in another manner by the viſible practice of good men, which reproaches our defects, and obliges us to the ſame zeal which laws, tho' wiſe and good, will not effect.

The example of our Saviour is moſt proper to form us to holineſs; it being abſolutely perfect, and accommodated to our preſent ſtate. There is no example of a mere man that is to be followed without limitation: But the example of Chriſt is abſolutely perfect; his converſation was a living law: "He was holy, harmleſs, undefiled, and ſeparate from ſinners."

EXAMPLE, in rhetoric, denotes an imperfect kind of induction or argumentation; whereby it is proved, that a thing which happened on ſome other occaſion will happen again on the preſent one, from the ſimilitude of the caſes. As, "The war of the Thebans, againſt their neighbours the Phocians, was ruinous; conſequently, that of the Athenians againſt their neighbours, will likewiſe be fatal."

EXANTHEMA, among phyſicians, denotes any kind of efflorescence or eruption, as the meaſles, purple ſpots in the plague, or malignant fevers, &c.

EXARCH, in antiquity, an appellation given, by the emperors of the eaſt, to certain officers ſent into Italy, in quality of vicars, or rather prefects, to defend that part of Italy which was yet under their obedience; particularly the city of Ravenna againſt the Lombards, who had made themſelves maſters of the greateſt part of the reſt.

The reſidence of the exarch was at Ravenna; which city, with that of Rome, were all that was left the emperors. The firſt exarch was the patrician Boetius, famous for his treatiſe, De Conſolatione Philoſophiæ; appointed in 568 by the younger Juſtin. The exarchs ſubſiſted about 185 years, and ended in Eutychius; under whoſe exarchate the city of Ravenna was taken by the Lombard king Aſtulphus, or Aſtolphus.

The emperor Frederic created Heraclius, archbiſhop of Lyons, a deſcendant of the illuſtrious houſe of Montboiſſier, exarch of the whole kingdom of Burgundy; a dignity till that time unknown any where but in Italy, particularly in the city of Ravenna.

Homer, Philo, and other ancient authors, give likewiſe the name *exarchus* to the choragus or maſter of the ſingers, in the ancient choruſes, or him who ſung firſt: the word ἀρχω, or ἀρχομαι, ſignifying equally *to begin*, and *to command*.

EXARCH of a Dioceſe was, anciently, the ſame with primate. This dignity was inferior to the patriarchal, yet greater than the metropolitan. Exarch ‖ Exception.

EXARCH alſo denotes an officer, ſtill ſubſiſting in the Greek church; being a kind of deputy or legate *à latere* of the patriarch, whoſe office it is to viſit the provinces allotted him, in order to inform himſelf of the lives and manners of the clergy; take cognizance of eccleſiaſtical cauſes; the manner of celebrating divine ſervice; the adminiſtration of the ſacraments, particularly confeſſion; the obſervance of the canons; monaſtic diſcipline; affairs of marriages, divorces, &c. but, above all, to take an account of the ſeveral revenues which the patriarch receives from ſeveral churches; and, particularly, as to what regards the collecting the ſame.

The exarch, after having greatly enriched himſelf in his poſt, frequently riſes to the patriarchate itſelf.

EXARCH is alſo uſed, in the eaſtern church antiquity, for a general or ſuperior over ſeveral monaſteries; the ſame that we otherwiſe call archimandrite; being exempted, by the patriarch of Conſtantinople, from the juriſdiction of the biſhops; as are now the generals of the Romiſh monaſtic orders.

EXAUCTORATIO, in the Roman military diſcipline, differed from the miſſio, which was a full diſcharge, and took place after they had ſerved in the army 20 years; whereas the exauctoratio was only a partial diſcharge: they loſt their pay indeed, but ſtill kept under their colours or *vexilla*, though not under the *aquila* (or eagle), which was the ſtandard of the legion: whence, inſtead of *Legionarii*, they were called *Subſignani*, and were retained till they had either ſerved their full time, or had lands aſſigned them. The exauctoratio took place after they had ſerved 17 years.

EXCALCEATION, among the Hebrews, was a particular law, whereby a widow, whom her huſband's brother refuſed to marry, had a right to ſummon him to a court of juſtice; and, upon his refuſal, might excalceate him, that is, pull off one of his ſhoes, and ſpit in his face; both of them actions of great ignominy.

EXCELLENCY, a title anciently given to kings and emperors, but now to ambaſſadors, generals, and other perſons who are not qualified for that of *highneſs*, and yet are to be elevated above the other inferior dignities.

EXCENTRIC, in geometry, a term applied to circles and ſpheres which have not the ſame centre, and conſequently are not parallel; in oppoſition to concentric, where they are parallel, having one common centre.

EXCENTRICITY, in aſtronomy, is the diſtance of the centre of the orbit of a planet from the centre of the ſun; that is, the diſtance between the centre of the ellipſis and the focus thereof.

EXCEPTION, ſomething reſerved, or ſet aſide, and not included in a rule.

It is become proverbial, that there is no rule without an exception; intimating, that it is impoſſible to comprehend all the particular caſes, under one and the ſame maxim. But it is dangerous following the exception preferably to the rule.

EXCEPTION, in law, denotes a ſtop or ſtay to an action; and is either dilatory or peremptory, in proceeding,

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Excerpt || Exchange.

ceedings at common law; but in chancery it is what the plaintiff alleges againſt the ſufficiency of an anſwer, &c.

An exception is no more than the denial of what is taken to be good by the other party, either in point of law or pleading. The counſel in a cauſe are to take all their exceptions to the record at one time, and before the court has delivered any opinion of it.

EXCERPT, in matters of literature. See EXTRACT.

EXCESS, in arithmetic and geometry, is the difference between any two unequal numbers or quantities, or that which is left after the leſſer is taken from or out of the greater.

EXCHANGE, in a general ſenſe, a contract or agreement, whereby one thing is given or exchanged for another.

EXCHANGE, in commerce, is the receiving or paying of money in one country for the like ſum in another, by means of bills of exchange.

The ſecurity which merchants commonly take from one another when they circulate their buſineſs, is a bill of exchange, or a note of hand: theſe are looked upon as payment. See BILL, and *Mercantile* LAWS.

The punctuality of acquitting theſe obligations is eſſential to commerce; and no ſooner is a merchant's accepted bill proteſted, than he is conſidered as a bankrupt. For this reaſon, the laws of moſt nations have given very extraordinary privileges to bills of exchange. The ſecurity of trade is eſſential to every ſociety; and were the claims of merchants to linger under the formalities of courts of law when liquidated by bills of exchange, faith, confidence, and punctuality, would quickly diſappear, and the great engine of commerce would be totally deſtroyed.

A regular bill of exchange is a mercantile contract, in which four perſons are concerned, viz. 1. The drawer, who receives the value: 2. His debtor, in a diſtant place, upon whom the bill is drawn, and who muſt accept and pay it: 3. The perſon who gives value for the bill, to whoſe order it is to be paid: and, 4. The perſon to whom it is ordered to be paid, creditor to the third.

By this operation, reciprocal debts, due in two diſtant parts, are paid by a ſort of transfer, or permutation of debtors and creditors.

(A) in London is creditor to (B) in Paris, value 100l. (C) again in London is debtor to (D) in Paris for a like ſum. By the operation of the bill of exchange, the London creditor is paid by the London debtor; and the Paris creditor is paid by the Paris debtor; conſequently, the two debts are paid, and no money is ſent from London to Paris nor from Paris to London.

In this example, (A) is the drawer, (B) is the accepter, (C) is the purchaſer of the bill, and (D) receives the money. Two perſons here receive the money, (A) and (D); and two pay the money, (B) and (C); which is juſt what muſt be done when two debtors and two creditors clear accounts.

This is the plain principle of a bill of exchange. From which it appears, that reciprocal and equal debts only can be acquitted by them.

When it therefore happens, that the reciprocal debts of London and Paris (to uſe the ſame example) are not equal, there ariſes a balance on one ſide. Suppoſe London to owe Paris a balance, value 100l. How can this be paid? Anſwer, It may either be done with or without the intervention of a bill. Exchange.

With a bill, if an exchanger, finding a demand for a bill upon Paris for the value of 100l. when Paris owes no more to London, ſends 100l. to his correſpondent at Paris in coin, at the expence (ſuppoſe) of 1l. and then, having become creditor on Paris, he can give a bill for the value of 100l. upon his being repaid his expence, and paid for his riſk and trouble.

Or it may be paid without a bill, if the London debtor ſends the coin himſelf to his Paris creditor, without employing an exchanger.

This laſt example ſhows of what little uſe bills are in the payment of balances. As far as the debts are equal, nothing can be more uſeful than bills of exchange; but the more they are uſeful in this eaſy way of buſineſs, the leſs profit there is to any perſon to make a trade of exchange, when he is not himſelf concerned either as debtor or creditor.

When merchants have occaſion to draw and remit bills for the liquidation of their own debts, active and paſſive, in diſtant parts, they meet upon 'Change; where, to purſue the former example, the creditors upon Paris, when they want money for bills, look out for thoſe who are debtors to it. The debtors to Paris again, when they want bills for money, ſeek for thoſe who are creditors upon it.

This market is conſtantly attended by brokers, who relieve the merchant of the trouble of ſearching for thoſe he wants. To the broker every one communicates his wants, ſo far as he finds it prudent; and by going about among all the merchants, the broker diſcovers the ſide upon which the greater demand lies, for money or for bills.

He who is the demander in any bargain, has conſtantly the diſadvantage in dealing with him of whom he demands. This is no where ſo much the caſe as in exchange, and renders ſecrecy very eſſential to individuals among the merchants. If the London merchants want to pay their debts to Paris, when there is a balance againſt London, it is their intereſt to conceal their debts, and eſpecially the neceſſity they may be under to pay them; from the fear that thoſe who are creditors upon Paris would demand too high a price for the exchange over and above par.

On the other hand, thoſe who are creditors upon Paris, when Paris owes a balance to London, are as careful in concealing what is owing to them by Paris, from the fear that thoſe who are debtors to Paris would avail themſelves of the competition among the Paris creditors, in order to obtain bills for their money, below the value of them, when at par. A creditor upon Paris, who is greatly preſſed for money at London, will willingly abate ſomething of his debt, in order to get one who will give him money for it.

From the operation carried on among merchants upon 'Change, we may diſcover the conſequence of their ſeparate and jarring intereſts. They are conſtantly intereſted in the ſtate of the balance. Thoſe who are creditors on Paris, fear the balance due to London; thoſe who are debtors to Paris, dread a balance due to Paris. The intereſt of the firſt is to diſſemble what they fear; that of the laſt, to exaggerate what they wiſh.

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Exchange. wiſh. The brokers are thoſe who determine the courſe of the day; and the moſt intelligent merchants are thoſe who diſpatch their buſineſs before the fact is known.

Now, how is trade in general intereſted in the queſtion, Who ſhall outwit, and who ſhall be outwitted, in this complicated operation of exchange among merchants?

The intereſt of trade and of the nation is principally concerned in the proper method of paying and receiving the balances. It is alſo concerned in preſerving a juſt equality of profit and loſs among all the merchants, relative to the real ſtate of the balance. Unequal competition among men engaged in the ſame purſuit, conſtantly draws along with it bad conſequences to the general undertaking; and ſecrecy in trade will be found, upon examination, to be much more uſeful to merchants in their private capacity, than to the trade they are carrying on.

Merchants endeavour to ſimplify their buſineſs as much as poſſible; and commit to brokers many operations which require no peculiar talents to execute. This of exchange is of ſuch a nature, that it is hardly poſſible for a merchant to carry on the buſineſs of his bills, without their aſſiſtance, upon many occaſions. When merchants come upon 'Change, they are ſo full of fear and jealouſies, that they will not open themſelves to one another, leſt they ſhould diſcover what they want to conceal. The broker is a confidential man, in ſome degree, between parties, and brings them together.

Beſides the merchants who circulate among themſelves their reciprocal debts and credits ariſing from their importation and exportation of goods, there is another ſet of merchants who deal in exchange; which is the importation and exportation of money and bills.

Were there never any balance on the trade of nations, exchangers and brokers would find little employment: reciprocal and equal debts would eaſily be tranſacted openly between the parties themſelves. No man feigns and diſſembles, except when he thinks he has an intereſt in ſo doing.

But when balances come to be paid, exchange becomes intricate; and merchants are ſo much employed in particular branches of buſineſs, that they are obliged to leave the liquidation of their debts to a particular ſet of men, who make it turn out to the beſt advantage to themſelves.

Whenever a balance is to be paid, that payment coſts, Exchange. as we have ſeen, an additional expence to thoſe of the place who owe it, over and above the value of the debt.

If, therefore, this expence be a loſs to the trading man, he muſt either be repaid this loſs by thoſe whom he ſerves, that is, by the nation; or the trade he carries on will become leſs profitable.

Every one will agree, that the expence of high exchange upon paying a balance is a loſs to a people, no way to be compenſated by the advantages they reap from enriching the few individuals among them who gain by contriving methods to pay it off; and if an argument is neceſſary to prove this propoſition, it may be drawn from this principle, viz. whatever renders the profit upon trade precarious or uncertain, is a loſs to trade in general: this loſs is the conſequence of high exchange; and although a profit does reſult from it upon one branch of trade, the exchange-buſineſs, yet that cannot compenſate the loſs upon every other.

We may, therefore, here repeat what we have ſaid above, that the more difficulty is found in paying a balance, the greater is the loſs to a nation.

The Courſe of Exchange.

THE courſe of exchange is the current price betwixt two places, which is always fluctuating and unſettled, being ſometimes above and ſometimes below par, according to the circumſtances of trade.

When the courſe of exchange riſes above par, the country where it riſes may conclude for certain, that the balance of trade runs againſt them. The truth of this will appear, if we ſuppoſe Britain to import from any foreign place goods to the value of 100,000 l. at par, and export only to the value of 80,000 l. In this caſe, bills on the ſaid foreign place will be ſcarce in Britain, and conſequently will riſe in value; and after the 80,000l. is paid, bills muſt be procured from other places at a high rate to pay the remainder, ſo that perhaps 120,000 l. may be paid for bills to diſcharge a debt of 100,000 l.

Though the courſe of exchange be in a perpetual flux, and riſes or falls according to the circumſtances of trade; yet the exchanges of London, Holland, Hamburgh, and Venice, in a great meaſure regulate thoſe of all other places in Europe.

I. *Exchange with Holland.*

MONEY-TABLE.

		Par in Sterling.		*s.*	*d.*
8 Pennings, or 2 duytes,		1 groat or penny	=	0	0.54
2 Groats, or 16 pennings,		1 ſtiver	=	0	1.09
6 Stivers, or 12 pence,		1 ſchilling	=	0	6.56
20 Schillings,	make	1 pound Flemiſh	=	10	11.18
20 Stivers, or 40 pence,		1 gilder or florin	=	1	9.86
6 Guilders, or florins,		1 pound Flemiſh	=	10	11.18
2½ Guilders, or florins,		1 rixdollar	=	4	6.66

In Holland there are two ſorts of money, bank and current. The bank is reckoned good ſecurity; demands on the bank are readily anſwered; and hence bank-money is generally rated from 3 to 6 *per cent.* better than the current. The difference between the bank and current money is called the *agio.*

Bills on Holland are always drawn in bank-money; and if accounts be ſent over from Holland to Britain in

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Exchange. current money, the Britiſh merchant pays theſe accounts by bills, and in this caſe has the benefit of the agio.

PROB. I. *To reduce bank-money to current money.*

RULE. As 100 to 100+agio, ſo the given guilders to the anſwer.

EXAMP. What will 2210 guilders in bank-money amount to in Holland currency, the agio being $3\frac{1}{8}$ *per cent.*?

Guild.

As 100 : $103\frac{1}{8}$ :: 2210
8 8 825

800 825 11050
4420
17680

Guild. ſt. pen.
8|00)18232|50(2279 1 4 cur.
16...20

22 10|00(
16 8

63 2
56 16

72 32
72 32

Or, by practice,

50)2210
44.2 = 2 *per cent.*
22.1 = 1 *per cent.*
2.7625 = $\frac{1}{8}$ *per cent.*

2279.0625

If the agio only be required, make the agio the middle term, thus:

Guil. ſt. pen.

As 100 : $3\frac{1}{8}$ :: 2210 : 69 1 4 agio. Or, work by practice, as above.

PROB II. *To reduce current money to bank-money.*

RULE. As 100+agio to 100, ſo the given guilders to the anſwer.

EXAMPLE. What will 2279 guilders 1 ſtiver 4 pennings, Holland currency, amount to in bank-money, the agio being $3\frac{1}{8}$ *per cent.*?

Guild. *Guild.* *Guild. ſt. pen.*
As $103\frac{1}{8}$: 100 :: 2279 1 4
8 8 20

825 800 45581
20 16

16500 273490
16 45581

990 729300
165 800

8)264|000 8)58344|000
3)33 3)72930 *Guild.*
11 11)24310(2210 bank.

N° 122.

In Amſterdam, Rotterdam, Middleburgh, &c. books Exchange. and accounts are kept by ſome in guilders ſtivers and pennings, and by others in pounds ſhillings and pence Flemiſh.

Britain gives 1 l. Sterling for an uncertain number of ſhillings and pence Flemiſh. The par is 1 l. Sterling for 36.59 s. Flemiſh; that is, 1 l. 16 s. 7.08 d. Flemiſh.

When the Flemiſh rate riſes above par, Britain gains and Holland loſes by the exchange, and *vice verſa*.

Sterling money is changed into Flemiſh, by ſaying,

As 1 l. Sterling to the given rate,
So is the given Sterling to the Flemiſh ſought.

Or, the Flemiſh money may be caſt up by practice.

Dutch money, whether pounds, ſhillings, pence Flemiſh, or guilders, ſtivers, pennings, may be changed into Sterling, by ſaying,

As the given rate to 1 l. Sterling,
So the given Dutch to the Sterling ſought.

EXAMPLE. 1. A merchant in Britain draws on Amſterdam for 782 l. Sterling: How many pounds Flemiſh, and how many guilders, will that amount to, exchange at 34 s. 8 d. *per* pound Sterling?

L.	*s.*	*d.*	*L.*
If 1	: 34	8 ::	782
	12		
	416		
	782		
	832		
	3328		
	2912		
	12)325312		
		d.	
	2|0) 2710|9	4	

L. 1355 9 4 *Flem.*

Decimally.

L.	*s.*	*L.*
If 1	: 34.6 ::	782
	782	
	693	
	27733	
	24266	
	2|0)2710|9.3	

L. 1355 9 4 *Flem.*

By practice.

	L.	*s.*	*d.*
	782		
10 s. = $\frac{1}{2}$	391		
4 s. = $\frac{1}{5}$	156	8	
8 d. = $\frac{1}{60}$	26	1	4
	1355	9	4 *Fl.*

Or thus:

	L.	*s.*	*d.*
	782		
14 s. = $\frac{7}{10}$	547	8	
8 d. = $\frac{1}{10}$	26	1	4
	1355	9	4 *Fl.*

Multiply the Flemiſh pounds and ſhillings by 6, and the product will be guilders and ſtivers; and if there be any pence, multiply them by 8 for pennings; or, divide the Flemiſh pence by 40, and the quot will be guilders, and the half of the remainder, if there be any, will be ſtivers, and one penny odd will be half a ſtiver, or 8 pennings, as follows:

L. *s.* *d.*
1355 9 4
6

Guild. 8132 16 *ſtiv.*

Flem. pence.
4|0)32531|2(32 *rem.*

Guild. 8132 16 *ſtiv.*

2. Change 591 l. 5 s. Flemiſh into Sterling money, exchange at 37 s. 6 d. Flemiſh *per* l. Sterling.

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Exchange.

	Flem.		Ster.	Flem.	
	s.	d.	L.	L.	s.
If	37	6	: 1 ::	591	5
	2			20	
	5)75			11025	
	4)15			2	
	3			5)23650	
				5) 4730	
				3) 946	
				315½	

L. s. d.
Anſ. 315 5 8 Ster.

Decimally.

	5) L.		L.	5) L.
If	1.875	: 1 ::		591.25
5)	.375		5)	118.25
5)	.075		5)	23.65
	.015		.015)	4.73(313.3
				45
				23
				15
				80
				75
				50
				45
				*5

Holland exchanges with other nations as follows, *viz.* with

	Flem. d.
Hamburgh, on the dollar,	= 66⅔
France, on the crown,	= 54
Spain, on the ducat,	= 109⅞
Portugal, on the cruſade,	= 50
Venice, on the ducat,	= 93
Genoa, on the pezzo,	= 100
Leghorn, on the piaſtre,	= 100
Florence, on the crown,	= 120
Naples, on the ducat,	= 74⅞
Rome, on the crown,	= 136
Milan, on the ducat,	= 102
Bologna, on the dollar,	= 94⅘

Exchange between Britain and Antwerp, as alſo the Auſtrian Netherlands, is negociated the ſame way as with Holland; only the par is ſomewhat different, as will be deſcribed in article 2d, following.

II. *Exchange with Hamburgh.*

MONEY-TABLE.

		Par in Sterling.	s.	d.
12 Phennings	make	1 ſchilling-lub =	0	1½
16 Schilling-lubs		1 mark =	1	6
2 Marks		1 dollar =	3	0
3 Marks		1 ſixdollar. =	4	6
6½ Marks		1 ducat =	9	4½

Books and accounts are kept at the bank, and by moſt people in the city, in marks, ſchilling-lubs, and phennings; but ſome keep them in pounds, ſchillings, and groots Flemiſh. Exchange.

The agio at Hamburgh runs between 20 and 40 *per cent.* All bills are paid in bank-money.

Hamburgh exchanges with Britain by giving an uncertain number of ſchillings and groots Flemiſh for the pound Sterling. The groot or penny Flemiſh here, as alſo at Antwerp, is worth $\frac{14}{15}$ of a penny Sterling; and ſo ſomething better than in Holland, where it is only $\frac{14}{100}$d. Sterling.

		Flemiſh.
6 Phennings	make	1 groot or penny
6 Schilling-lubs		1 ſchilling
1 Schilling-lub		2 pence or groots
1 Mark		32 pence or groots
7½ Marks		1 pound.

The par with Hamburgh, and alſo with Antwerp, is 35s. 6½d. Flemiſh for 1l. Sterling.

EXAMPLES. 1. How many marks muſt be received at Hamburgh for 300l. Sterling, exchange at 35s. 3d. Flemiſh *per* 1 Sterling?

	L.	s.	d.	L.
If	1 :	35	3 ::	300
		12		
		423		
		300		
				M. ſch.
	32)126900(			3965 10
		96...		
		309		
		288		
		210		
		192		
		180		
		160		
		(20)		
		16		
		)320		
		32		
		(0)		

Decimally.

	Flem. s.	Marks.	Flem. s.
If	20 :	7.5 ::	35.25
	4 :	1.5 ::	35.25
			1.5
			17625
			3525
			4)52.875
Marks in 1l. Sterling			13.21875
			300
Marks in 300l. Sterling			3965.62500
			16
			3750
			625
Schilling-lubs			10.000

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Exchange. 2. How much Sterling money will a bill of 3965 mark 10 ſchilling-lubs amount to, exchange at 35s. 3d. Flemiſh *per* pound Sterling?

Fl.s.	*d.*	*L.St.*	*Mks*	*ſch.*
If 35	3 : 1 ::	3965	10	
12		32	2	
423		7930	20d.	
		11897		

423)126900(300l. ſter.
1269

Decimally.

4 : 1.5 :: 35.25
1.5
17625
2225
4)52.875(13.21875
13.21875)3965.62500(300l. ſter.
3965625

III. *Exchange with France.*

MONEY-TABLE.

		Par in Ster.	*s. d.*
12 Deniers	make	1 ſol =	0 0 1/10
20 Sols	make	1 livre =	0 9 1/4
3 Livres	make	1 crown =	2 5 1/4

At Paris, Rouen, Lyons, &c. books and accounts are kept in livres, ſols, and deniers; and the exchange with Britain is on the crown, or ecu, of 3 livres, or 60 ſols Tournois. Britain gives for the crown an uncertain number of pence, commonly between 30 and 34, the par, as mentioned above, being 29 1/4 d.

EXAMPLE. 1. What Sterling money muſt be paid in London to receive in Paris 1978 crowns 25 ſols, exchange at 31 1/8 d. *per* crown?

Sols.	*d.*	*Cr.*	*ſols.*
If 60 :	31 1/8 ::	1978	25
		60	
253		118705	
		253	
		356115	
		593525	
		237410	

60)30032365 Rem.

8)500539 3
12)62567 11
20)5213 13

L. 260 13 11 1/2 *Anſ.*

By Practic.

Cr.	*Sols.*	
1978	25, at 31 1/8 d.	
30 = 1/2	247	5 0
1 1/2 = 1/20	12	7 3
1/8 = 1/12	1	0 7 1/4
Sols 20 = 1/3	0	0 10 1/2
5 = 1/4	0	0 2 3/4
	260	13 11 1/2

If you work decimally, ſay,

Cr. d. Ster. Cr. d. Ster.
As 1 : 31.625 :: 1978.416 : 62567.427083

2. How many French livres will L. 121 : 18 : 6 Sterling amount to, exchange at 32 1/8 d. *per* crown?

d.	*Liv.*	*L.*	*s.*	*d.*
If 32 1/8 :	3 ::	121	18	6
	8		20	
263				
	24		2438	
			12	
			29262	
			24	
			117048	
			58524	

Liv. ſols. den.
263)702288(2670 5 11 *Anſ.*
Rem. (78=5 ſols 11 deniers.

IV. *Exchange with Portugal.*

MONEY-TABLE.

		Par in Ster.	*s. d. f.*
		1 ree =	0 0 0.27
400 rees	make	1 cruſade =	2 3
1000 rees	make	1 milree =	5 7 1/2

In Liſbon, Oporto, &c. books and accounts are generally kept in rees and millrees; and the millrees are diſtinguiſhed from the rees by a mark ſet between them thus, 485 ℣ 372; that is, 485 millrees and 372 rees.

Britain, as well as other nations, exchanges with Portugal on the millree; the par, as in the table, being 67 1/2 d. Sterling. The courſe with Britain runs from 63d. to 68d. Sterling *per* millree.

EXAMPLE. 1. How much Sterling money will pay a bill of 827 ℣ 160 rees, exchange at 63 1/8 d. Sterling *per* millree?

Rees.	*d.*	*Rees.*
If 1000 :	63 1/8 ::	827.160
8		507
8000	507	579012
		413580

8000)419370.120 Rem. 2

12) 52421 — 5d.
20) 4368 — 8s.

L. 218 8 5 1/4 *Anſ.*

By Practice.

d.	*Rees.* 827.160, at 63 1/8 d.
60 = 3/4	206.790
3 = 1/20	10.3395
3/8 = 1/12	.861625
1/8 = 1/8	.4308125
	218.4219375

The

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Exchange. The rees being thouſandth-parts of the millrees, are annexed to the integer, and the operation proceeds exactly as in decimals.

2. How many rees of Portugal will 500 l. Sterling amount to, exchange at 5s. 4⅛d. *per* millree?

d.	*Rees.*	*L.*
If 64⅛ :	1000 ::	500
	8	20
517	8000	10000
		12
		120000
		8000

Rees.

517)960000000(1856.866 *Anſ.*

V. *Exchange with Spain.*

MONEY-TABLE.

		Par in Ster.	*s.*	*d.*
35 mervadies		1 rial	= 0	5⅛
8 rials	make	1 piaſtre	= 3	7
375 mervadies		1 ducat	= 4	11¼

In Madrid, Bilboa, Cadiz, Malaga, Seville, and moſt of the principal places, books and accounts are kept in piaſtres, called alſo *dollars*, rials, and mervadies; and they exchange with Britain generally on the piaſtre, and ſometimes on the ducat. The courſe runs from 35d. to 45d. Sterling for a piaſtre or dollar of 8 rials.

EXAMP. 1. London imports from Cadiz goods to the value of 2163 piaſtres and 4 rials: How much Sterling will this amount to, exchange at 38⅛ d. Sterling *per* piaſtre?

d.		*Piaſt.*	*Rials.*			*d.*
		2163	4, at	38⅛ d.	*Rials.*	38⅛ each.
24	= ⅛	216	6		4 =	19⅜
12	= ¼	108	3			
2	= ⅙	18	0	6		
½	= 1/12	2	5	0½		
⅛	= 1/24	1	2	6⅛		
		345	17	1⅛		
			1	7⅜		

L. 345 18 8⅜ *Anſ.*

2. London remits to Cadiz 345 l. 18s. 8⅜d. How much Spaniſh money will this amount to, exchange at 38⅛ d. Sterling *per* piaſtre?

d.	*Piaſt.*	*L.*	*s.*	*d.*
If 38⅛ :	1 ::	345	18	8⅜
		20		
307		6918		
2		12		
614		83024		
		16		
		498149		
		83024		
Carried up		1328389		

614)1328389(2163 piaſtres.
1228 ···
1003
614
3898
3684
2149
1842
307
8

Piaſt.	*Rials.*
Anſ. 2163	4

614)2456(4 rials.
2456

VI. *Exchange with Venice.*

MONEY-TABLE.

5⅓ Soldi	make	1 gros	
24 Gros		1 ducat =	50¼ d. Sterling.

The money of Venice is of three ſorts, *viz.* two of bank money, and the picoli money. One of the banks deals in banco money, and the other in banco current. The bank money is 20 *per cent.* better than the banco current, and the banco current 20 *per cent.* better than the picoli money. Exchanges are always negociated by the ducat banco, the par being 4s. 2¼ d. Sterling, as in the table.

Though the ducat be commonly divided into 24 gros, yet bankers and negotiators, for facility of computation, uſually divide it as follows, and keep their books and accounts accordingly.

12 Deniers d'or	make	1 ſol d'or	
20 Sols d'or		1 ducat =	50¼ d. Sterling.

The courſe of exchange is from 45d. to 55d. Sterling *per* ducat.

EXAMP. 1. How much Sterling money is equal to 1459 ducats 18 ſols 1 denier, bank-money of Venice, exchange at 52¼ d. Sterling *per* ducat?

Duc.	*d.*	*Duc. ſol. den.*			*d.*
If 1 :	52¼ ::	1459	18	1	52¼ rate.
		52¼		*Sols.*	
		2918		10 = ½	26⅛
		7295		5 = ¼	13⅛
				2 = 1/10	5⅛
	d.	75868		1 = 1/20	2⅝
	½ =	729⅝		den. 1 = 1/240	0⅜
	¼ =	364⅜			47⅝
		76962⅜			
		47⅝			

Rem.

12)77010(6d.

20)6417(17s.

L. 320 17 6 Sterling. *Anſ.*

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Exchange. 2. How many ducats at Venice are equal to 385 l. 12 s. 6 d. Sterling, exchange at 4s. 4 d. *per* ducat?

L. Duc. L.
If .21£ : 1 :: 385.625
.21£)385.625
21 385.625

Duc.
195)347062.5(1779.8 *Anſ.*
195

1520
1365

1556
1365

1912
1755

1575
1560

(15)

Bank-money is reduced to current money, by allowing for the agio, as was done in exchange with Holland; *viz.* ſay, As 100 to 120, or as 10 to 12, or as 5 to 6, ſo the given bank-money to the current ſought. And current money is reduced to bank-money by reverſing the operation. And in like manner may picoli-money be reduced to current or to bank money, and the contrary.

100 ducats banco of Venice.
In Leghorn = 73 pezzos | In Lucca = 77 crowns
In Rome = 68½ crowns | In Francfort = 139½ florins.

VII. *Exchange with Genoa.*

MONEY-TABLE.

12 Denari, 20 Soldi } make { 1 ſoldi s. d.; 1 pezzo = 4 6 Sterling.

Books and accounts are generally kept in pezzos, ſoldi, and denari: but ſome keep them in lires, ſoldi, and denari; and 12 ſuch denari make 1 ſoldi, and 20 ſoldi make 1 lire.

The pezzo of exchange is equal to 5¼ lires; and, conſequently, exchange-money is 5¼ times better than the lire money. The courſe of exchange runs from 47 d. to 58 d. Sterling *per* pezzo.

EXAMP. How much Sterling money is equivalent to 3390 pezzos 16 ſoldi of Genoa, exchange at 51⅞ d. Sterling *per* pezzo?

Soldi. d. Pez. ſoldi.
If 20 : 51⅞ :: 3390 16
8 20
415
160 67816
415
339080
67816
271264

d. L. s. d.
160)28143640(175897½ = 732 18 1½

If Sterling money be given, it may be reduced or changed into pezzos of Genoa, by reverſing the former operation.

Exchange money is reduced to lire-money, by being multiplied by 5¼, as follows: Exchange.

Pez. ſoldi. Decimally.
3390 16 3390.8
5¼ 5.75

16954 0 169540
½ = 1695 8 237356
¼ = 847 14 169540

Lires 19497 2 Lires 19497.100

And lire-money is reduced to exchange-money by dividing it by 5¼.

In Milan, 1 crown = 80
In Naples, 1 ducat = 86
In Leghorn, 1 piaſtre = 20
In Sicily, 1 crown = 127½

VIII. *Exchange with Leghorn.*

MONEY-TABLE.

12 Denari, 20 Soldi } make { 1 ſoldi s. d.; 1 piaſtre = 4 6 *Ster.*

Books and accounts are kept in piaſtres, ſoldi, and denari. The piaſtre here conſiſts of 6 lires, and the lire contains 20 ſoldi, and the ſoldi 12 denari, and conſequently exchange money is 6 times better than lire money. The courſe of exchange is from 47 d. to 58 d. Sterling *per* piaſtre

EXAMPLE. What is the Sterling value of 731 piaſtres, at 55½ each?

731 piaſtres, at 55½ d.

s. d.
4 or 48 = ½ 146 4
6 = ⅛ 18 5 6
1½ = ¼ 4 11 4½

L. 169 0 10½ *Anſ.*

Sterling-money is reduced to money of Leghorn, by reverſing the former operation; and exchange-money is reduced to lire-money by multiplying by 6, and lire-money to exchange-money by dividing by 6.

100 piaſtres of Leghorn are
In Naples = 134 ducats | In Geneva = 185⅓ crowns.

Soldi of Leghorn.

In Sicily, 1 crown = 133⅓
In Sardinia, 1 dollar = 95⅕

The above are the chief places in Europe with which Britain exchanges directly; the exchanges with other places are generally made by bills on Hamburgh, Holland, or Venice. We ſhall here, however, ſubjoin the par of exchange betwixt Britain and moſt of the other places in Europe with which ſhe has any commercial intercourſe.

Par in Sterling L. s. d.

Rome,	1	crown	=	6 1⅓
Naples,	1	ducat	=	3 4½
Florence,	1	crown	=	5 4½
Milan,	1	ducat	=	4 7
Bologna,	1	dollar	=	4 3
Sicily,	1	crown	=	5 0
Vienna,	1	rixdollar	=	4 8
Augſburgh,	1	florin	=	3 1⅕
Francfort,	1	florin	=	3 0
Bremen,	1	rixdollar	=	3 6
Breſlau,	1	rixdollar	=	3 3

Berlin,

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Exchange.

				Par in Sterling L.	s.	d.
Berlin,	1	rixdollar	=	4	0	
Stetin,	1	mark	=	1	6	
Embden,	1	rixdollar	=	3	6	
Bolfenna,	1	rixdollar	=	3	8	
Dantzic,	15½	florins	=	1	0	0
Stockholm,	34⅘	dollars	=	1	0	0
Ruffia,	1	ruble	=	4	5	
Turkey,	1	afper	=	4	6	

The following places, *viz.* Switzerland, Nuremburgh, Leipfic, Drefden, Ofnaburgh, Brunfwic, Cologn, Leige, Strafburgh, Craeow, Denmark, Norway, Riga, Revil, Narva, exchange with Britain, when direct exchange is made, upon the rixdollar, the par being 4 s. 6 d. Sterling.

IX. *Exchange with America and the Weft Indies.*

In North America and the Weft Indies, accounts, as in Britain, are kept in pounds, fhillings, and pence. In North America they have few coins circulating among them, and on that account have been obliged to fubftitute a paper-currency for a medium of their commerce; which having no intrinfic value, is fubjected to many difadvantages, and generally fuffers a great difcount. In the Weft Indies coins are more frequent, owing to their commercial intercourfe with the Spanifh fettlements.

Exchange betwixt Britain and America, or the Weft Indies, may be computed as in the following examples:

1. The neat proceeds of a cargo from Britain to Bofton amount to 845 l. 17 s. 6 d. currency: How much is that in Sterling money, exchange at 80 *per cent.*?

If 180 : 100
18 : 10
9 : 5 :: 845 17 6
5
9)4229 7 6
L. 469 18 7½ Ster. *Anf.*

2. Boftun remits to Britain a bill of 469 l. 18 s. 7½ d. Sterling: How much currency was paid for the bill at Boftun, exchange at 80 *per cent.*?

If 100 : 180
5 : 9 :: 469 18 7½
9
5)4229 7 6
845 17 6 currency. *Anf.*

3. How much Sterling money will 1780 l. Jamaica currency amount to, exchange at 40 *per cent.*?

If 140 : 100
14 : 10
7 : 5 :: 1780
5
7)8900
s. d.
1271 8 6½ Ster. *Anf.*

Bills of exchange from America, the rate being high, is an expenfive way of remitting money to Britain; and therefore merchants in Britain generally choofe to have the debts due to them remitted home in fugar, rum, or other produce.

X. *Exchange with Ireland.*

Exchange.

At Dublin, and all over Ireland, books and accounts are kept in pounds, fhillings, and pence, as in Britain; and they exchange on the 100 l. Sterling.

The par of one fhilling Sterling is one fhilling and one penny Irifh; and fo the par of 100 l. Sterling is 108 l. 6 s. 8 d. Irifh. The courfe of exchange runs from 6 to 15 *per cent.*

Examp. 1. London remits to Dublin 586 l. 10 s. Sterling: How much Irifh money will that amount to, exchange at 9⅛ *per cent.*?

L.
If 100 : 109⅛ :: 586.5
8 877
800 : 877 41055
41055
46920
800)514360.5
642.950625
Anf. 642 l. 19 s. Irifh.

By practice.

586.5

p. cent.		
10 =	1/10	58.65
2 =	1/5	11.73 fub.
8 =		46.92
½ =	1/16	5.865
⅜ =	1/25	2.9325
⅛ =	1/4	.733125
9⅛		56.450625 add.

642.950625

2. How much Sterling will 625 l. Irifh amount to, exchange at 10½ *per cent.*?

If 110½ : 100 :: 625
8 800
883 800 883)500000(566 5 0½ Ster. *Anf.*
L. s. d.

XI. *Exchange betwixt London and other places in Britain.*

The feveral towns in Britain exchange with London for a fmall premium in favour of London; fuch as, 1, 1¼, &c. *per cent.* The premium is more or lefs, according to the demand for bills?

Examp. Edinburgh draws on London for 860 l. exchange at 1½ *per cent.*: How much money muft be paid at Edinburgh for the bill?

L.
860

per cent.		
1 =	1/100	8 12
¼ =	1/4	2 3
½ =	1/2	1 1 6

11 16 6 premium.
871 16 6 paid for the bill.

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Exchange. To avoid paying the premium, it is an uſual practice to take the bill payable at London a certain number of days after date; and in this way of doing, 73 days is equivalent to 1 *per cent.*

XII. *Arbitration of Exchanges.*

The courſe of exchange betwixt nation and nation naturally riſes or falls according as the circumſtances and balance of trade happen to vary. Now, to draw upon and remit to foreign places, in this fluctuating ſtate of exchange, in the way that will turn out moſt profitable, is the deſign of arbitration. Which is either ſimple or compound.

I. *Simple Arbitration.*

In ſimple arbitration the rates or prices of exchange from one place to other two are given; whereby is found the correſpondent price between the ſaid two places, called the *arbitrated price*, or *par of arbitration*: and hence is derived a method of drawing and remitting to the beſt advantage.

Examp. 1. If exchange from London to Amſterdam be 33 s. 9 d. *per* pound Sterling; and if exchange from London to Paris be 32 d. *per* crown; what muſt be the rate of exchange from Amſterdam to Paris, in order to be put on a par with the other two?

Ster. Flem. Ster.
s. s. d. d.
If 20 : 33 9 :: 32
12 12

240 405
32

810
1215

240)12960(54 d. Flem. *per* crown. *Anſ.*

2. If exchange from Paris to London be 32 d. Sterling *per* crown; and if exchange from Paris to Amſterdam be 54 d. Flemiſh *per* crown; what muſt be the rate of exchange between London and Amſterdam, in order to be on a par with the other two?

Ster. Flem. Ster.
d. d. d.
If 32 : 54 :: 240
240

216
108

12) *s. d.*
32)12960(405 (33 9 Flem. *per* l. Ster. *Anſ.*

From theſe operations it appears, that if any ſum of money be remitted, at the rates of exchange mentioned, from any one of the three places to the ſecond, and from the ſecond to the third, and again from the third to the firſt, the ſum ſo remitted will come home entire, without increaſe or diminution.

From the par of arbitration thus found, and the courſe of exchange given, is deduced a method of drawing and remitting to advantage, as in the following example.

3. If exchange from London to Paris be 32 d. Sterling *per* crown, and to Amſterdam 405 d. Flemiſh *per* pound Sterling; and if, by advice from Holland to France, the courſe of exchange between Paris and Amſterdam is fallen to 52 d. Flemiſh *per* crown; what may be gained *per cent.* by drawing on Paris, and remitting to Amſterdam? Exchange.

The par of arbitration between Paris and Amſterdam in this caſe, by Ex. 1. is 54 d. Flemiſh *per* crown. Work as under.

d. St. Cr. L. St. Cr.
If 32 : 1 :: 100 : 750 debit at Paris
Cr. d.Fl C. d.Fl.
If 1 : 52 :: 750 : 39000 credit at Amſterdam.
d.Fl. L.St. d.Fl. L. s. d.Ster.
If 405 : 1 :: 39000 : 96 5 $11\frac{1}{3}$ to be remitted.
100

3 14 $0\frac{8}{9}$

But if the courſe of exchange between Paris and Amſterdam, inſtead of falling below, riſe above the par of arbitration, ſuppoſe to 56 d. Flemiſh *per* crown; in this caſe, if you propoſe to gain by the negotiation, you muſt draw on Amſterdam, and remit to Paris. The computation follows.

L.St. d.Fl. L.St. d.Fl.
If 1 : 405 :: 100 : 40500 debit at Amſterdam.
d.Fl. Cr. d. F. Cr.
If 56 : 1 :: 40500 : $723\frac{3}{7}$ credit at Paris.
Cr. d.St. Cr. L. s. d. Ster.
If 1 : 32 :: $723\frac{3}{7}$: 96 8 $6\frac{6}{7}$ to be remitted.
100

3 11 $5\frac{1}{7}$ gained *per cent.*

In negotiations of this ſort, a ſum for remittance is afforded out of the ſum you receive for the draught; and your credit at the one foreign place pays your debt at the other.

II. *Compound Arbitration.*

In compound arbitration the rate or price of exchange between three, four, or more places, is given, in order to find how much a remittance paſſing through them all will amount to at the laſt place; or to find the arbitrated price, or par of arbitration, between the firſt place and the laſt. And this may be done by the following

Rules. I. Diſtinguiſh the given rates or prices into antecedents and conſequents; place the antecedents in one column, and the conſequents in another on the right, fronting one another by way of equation.

II. The firſt antecedent, and the laſt conſequent to which an antecedent is required, muſt always be of the ſame kind.

III. The ſecond antecedent muſt be of the ſame kind with the firſt conſequent, and the third antecedent of the ſame kind with the ſecond conſequent, &c.

IV. If to any of the numbers a fraction be annexed, both the antecedent and its conſequent muſt be multiplied into the denominator.

V. To facilitate the operation, terms that happen to be equal or the ſame in both columns, may be dropped or rejected, and other terms may be abridged.

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Exchange. VI. Multiply the antecedents continually for a divisor, and the consequents continually for a dividend, and the quot will be the answer or antecedent required.

EXAMP. 1. If London remit 1000 l. Sterling to Spain, by way of Holland, at 35 s. Flemish *per* pound Sterling; thence to France, at 58 d. Flemish *per* crown; thence to Venice, at 100 crowns *per* 60 ducats; and thence to Spain, at 360 mervadies *per* ducat; how many piastres, of 272 mervadies, will the 1000 l. Sterling amount to in Spain?

Antecedents.		*Consequents.*	*Abridged.*
1 l. Sterling	=	35 s. or 420 d. Fl.	1 = 210
58 d. Flemish	=	1 crown France	29 = 1
100 crowns France	=	60 ducats Venice	1 = 30
1 ducat Venice	=	360 mervadies Spain	1 = 45
272 mervadies	=	1 piastre	17 = 1
How many piastres	=	1000 l. Sterling	= 10

In order to abridge the terms, divide 58 and 420 by 2, and you have the new antecedent 29, and the new consequent 210; reject two ciphers in 100 and 1000; divide 272 and 360 by 8, and you have 34 and 45; divide 34 and 60 by 2, and you have 17 and 30; and the whole will stand abridged as above.

Then, $29 \times 17 = 493$ divisor; and $210 \times 30 \times 45 \times 10 = 2835000$ dividend; and, 493)2835000(5750$\frac{1}{2}$ piastres. *Anſ.*

Or, the consequents may be connected with the sign of multiplication, and placed over a line by way of numerator; and the antecedents, connected in the same manner, may be placed under the line, by way of denominator; and then abridged, as follows:

$$\frac{420\times60\times360\times100}{58\times100\times272} = \frac{210\times60\times360\times10}{29\times1\times272}$$
$$= \frac{210\times60\times45\times10}{29\times34} = \frac{210\times30\times45\times10}{29\times17}$$
$$= \frac{2835000}{493},$$

And, 493)2835000(5750$\frac{1}{2}$ piastres. *Anſ.*

The placing the terms by way of antecedent and consequent, and working as the rules direct, save so many statings of the rule of three, and greatly shortens the operation. The proportions at large for the above question would stand as under:

	L. St. d. Fl.		*L. St.*	*d. Fl.*
If	1 : 420	::	1000 :	420000.
	d. Fl. *Cr.*		*d. Fl.*	*Cr.*
If	58 : 1	::	420000 :	7241$\frac{11}{29}$.
	Cr. *Duc.*		*Cr.*	*Duc.*
If	100 : 60	::	7241$\frac{11}{29}$:	4344$\frac{24}{29}$.
	Duc. *Mer.*		*Duc.*	*Mer.*
If	1 : 360	::	4344$\frac{24}{29}$. :	1564137$\frac{27}{29}$.
	Mer. *Piaſt.*		*Mer.*	*Piaſt.*
If	272 : 1	::	1564137$\frac{27}{29}$:	5750$\frac{1}{2}\frac{56}{93}$

If we suppose the course of direct exchange to Spain to be 42$\frac{1}{2}$ d. Sterling *per* piastre, the 1000 l. remitted would only amount to 5647$\frac{1}{2}$ piastres; and, consequently, 103 piastres are gained by the negociation; that is, about 2 *per cent.*

2. A banker in Amsterdam remits to London 400 l. Flemish; first to France at 56 d. Flemish *per* crown; from France to Venice, at 100 crowns *per* 60 ducats; from Venice to Hamburgh, at 100 d. Flemish *per* ducat from Hamburgh to Lisbon, at 50 d. Flemish *per* crusade of 400 rees; and, lastly, from Lisbon to London at 64 d. Sterling *per* millree: How much Sterling money will the remittance amount to? and how much will be gained or saved, supposing the direct exchange from Holland to London at 36 s. 10 d. Flemish *per* pound Sterling? Exchange.

Antecedents.		*Consequents.*
56 d. Flem.	=	1 crown
100 crowns	=	60 ducats:
1 ducat	=	100 d. Flem.
50 d. Flem.	=	400 rees.
1000 rees	=	64 d. Sterling.

How many d. Ster. = 400 l. or 960000 d. Flemish?

This, in the fractional form, will stand as follows.

$$\frac{60\times100\times400\times64\times96000}{65\times100\times50\times1000} = \frac{368640}{7}, \text{ and}$$

7)368640(52662 $\frac{6}{7}$ d. Ster. = 219 l. 8 s. 6$\frac{6}{7}$ d. St. *Anſ.*

To find how much the exchange from Amsterdam directly to London, at 36 s. 10 d. Flemish *per* l. Sterling, will amount to, say,

s.	*d.*		*d. Fl.*	*L. St.*	*d. Fl.*		*L.*	*s.*	*d. St.*
36	10	If	442	: ::	96000	:	217	3	10$\frac{1}{2}$
12							219	8	6$\frac{6}{7}$
442						Gained or saved,	2	4	8$\frac{1}{2}$

In the above example, the par of arbitration, or the arbitrated price, between London and Amsterdam, *viz.* the number of Flemish pence given for 1 l. Sterling, may be found thus:

Make 64 d. Sterling, the price of the millree, the first antecedent; then all the former consequents will become antecedents, and all the antecedents will become consequents. Place 240, the pence in 1 l. Sterling, as the last consequent, and then proceed as taught above, *viz.*

Antecedents.		*Consequents.*
64 d. Ster.	=	1000 rees.
400 rees	=	50 d. Flem.
100 d. Flem.	=	1 ducat.
60 ducats	=	100 crowns.
1 crown	=	56 d. Flem.

How many d. Flem. = 240 d. Ster.?

$$\frac{1000\times50\times100\times56\times240}{64\times400\times100\times60} = \frac{875}{2}, \text{ and}$$

2)875(437$\frac{1}{2}$ d. = 36 s. 5$\frac{1}{2}$ d. Flem. *per* l. Ster. *Anſ.*

Or the arbitrated price may be found from the answer to the question, by saying

d. Ster.	*d. Flem.*	*d. St.*
If 368$\frac{6}{7}$40	: 96000	:: 240
7		
672000		
240.		
2688.		
1344.		
d.	*s.*	*d. Flem.*

368640)161280000(437$\frac{1}{2}$ = 36 5$\frac{1}{2}$ as before.

The work may be proved by the arbitrated price thus: As 1 l. Sterling to 36 s. 5$\frac{1}{2}$ d. Flemish, so 219 l. 8 s. 6$\frac{6}{7}$ d Sterling to 400 l. Flemish.

The

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Exchange, Exchequer.

The arbitrated price compared with the direct courſe ſhows whether the direct or circular remittance will be moſt advantageous, and how much. Thus the banker at Amſterdam will think it better exchange to receive 1l. Sterling for 36s 5¼d. Flemiſh, than for 36s. 10d. Flemiſh.

EXCHANGE ſignifies alſo a place in moſt conſiderable trading cities, wherein the merchants, negociants, agents, bankers, brokers, interpreters, and other perſons concerned in commerce, meet on certain days, and at certain times thereof, to confer and treat together of matters relating to exchanges, remittances, payments, adventures, aſſurances, frieghtments, and other mercantile negociations, both by ſea and land.

In Flanders, Holland, and ſeveral cities of France, theſe places are called *burſes*; at Paris and Lyons, *places de change*; and in the Hanſe towns, *colleges of merchants*. Theſe aſſemblies are held with ſo much exactneſs, and merchants and negociants are ſo indiſpenſably required to attend at them, that a perſon's abſence alone makes him be ſuſpected of a failure or bankruptcy. The moſt conſiderable exchanges in Europe, are that of Amſterdam; and that of London, called the *Royal Exchange*.

Even in the time of the ancient Romans, there were places for the merchants to meet, in moſt of the conſiderable cities of the empire. That ſaid by ſome to have been built at Rome in the year of the city 259, 493 years before our Saviour, under the conſulate of Appius Claudius and Publius Servilius, was called *collegium mercatorum*; whereof it is pretended there are ſtill ſome remains, called by the modern Romans *loggia*, the lodge; and now, uſually, the Place of St George. This notion of a Roman exchange is ſuppoſed to be founded on the authority of Livy, whoſe words are as follow; viz. *Certamen conſulibus inciderat, uter dedicaret Mercurii ædem. Senatus a ſe rem ad populum rejecit: utri eorum dedicatio juſſu populi data eſſet, eum præeſſe annonæ, mercatorium collegium inſtituere juſſit.* Liv. lib. ii. But it muſt be here remarked, that *collegium* never ſignified a building for a ſociety in the purer ages of the Latin tongue; ſo that *collegium mercatorum inſtituere* muſt not be rendered to build an exchange for the merchants, but to incorporate the merchants into a company. As Mercury was the God of traffick, this *ædes Mercuri* ſeems to have been chiefly deſigned for the devotions of this company or corporation.

EXCHEQUER, in the Britiſh juriſprudence, an ancient court of record, in which all cauſes concerning the revenues and rights of the crown are heard and determined, and where the crown revenues are received. It took this name from the cloth that covered the table of the court, which was party-coloured, or chequered.

This court is ſaid to have been erected by William the Conqueror, its model being taken from a like court eſtabliſhed in Normandy long before that time. Anciently its authority was ſo great, that it was held in the king's palace, and the acts thereof were not to be examined or controlled in any other of the king's courts; but, at preſent, it is the laſt of the four courts at Weſtminſter.

In the exchequer, ſome reckon ſeven courts, viz. thoſe of pleas, accounts, receipts, exchequer-chamber (which is an aſſembly of all the judges on difficult matters in law), errors in the exchequer, errors in the king's bench, and, laſtly, the court of equity in the exchequer. Exchequer.

But the exchequer, for the diſpatch of buſineſs, is generally divided into two parts; one of which is chiefly converſant in the judicial hearing and deciding of all cauſes relating to the king's coffers, formerly termed the *exchequer of accounts*: the other is called the *receipt of the exchequer*, as being principally employed in receiving and paying of money.

Officers of the receipt may take one penny in the pound, as their fee for ſums iſſued out; and they are obliged, without delay, to receive the money brought thither; and the money received is to be put into cheſts under three different locks and keys, kept by three ſeveral officers. All ſheriffs, bailiffs, &c. are to account in the exchequer; and in the lower part, termed the receipt, the debtors of the king, and perſons in debt to them, the king's tenants, and the officers and miniſters of the court, are privileged to ſue one another, or any ſtranger, and to be ſued in the like actions as are brought in the courts of king's bench and common-pleas.

The judicial part of the exchequer, is a court both of law and equity. The court of law is held in the office of pleas, according to the courſe of common law, before the barons: in this court, the plaintiff ought to be a debtor or accountant to the king; and the leading proceſs is either a writ of ſubpœna, or quo minus, which laſt goes into Wales, where no proceſs out of courts of law ought to run, except a capias utlagatum.

The court of equity is held in the exchequer chamber before the treaſurer, chancellor, and barons; but, generally, before the barons only: the lord chief baron being the chief judge to hear and determine all cauſes. The proceedings in this part of the exchequer are by Engliſh bill and anſwer, according to the practice of the court of chancery; with this difference, that the plaintiff here muſt ſet forth, that he is a debtor to the king, whether he be ſo or not. It is in this court of equity that the clergy exhibit bills for the recovery of their tythes, &c. Here too the attorney-general exhibits bills for any matters concerning the crown; and a bill may be exhibited againſt the king's attorney by any perſon aggrieved in any cauſe proſecuted againſt him on behalf of the king, to be relieved therein: in which caſe, the plaintiff is to attend on the attorney-general, with a copy of the bill, and procure him to give in an anſwer thereto; in the making of which he may call in any perſon intereſted in the cauſe, or any officer, or others, to inſtruct him, that the king be not prejudiced thereby, and his anſwer is to be put in without oath.

But, beſides the buſineſs relating to debtors, farmers, receivers, accountants, &c all penal puniſhments, intruſion, and forfeitures upon popular actions, are matters likewiſe cognizable by this court; where there alſo ſits a puiſne-baron, who adminiſters the oaths to high ſheriffs, bailiffs, auditors, receivers, collectors, comptrollers, ſurveyors, and ſearchers of all the cuſtoms, &c.

The exchequer in Scotland has the ſame privileges and juriſdiction as that of England; and all matters competent to the one are likewiſe competent to the other.

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Exchequer, Excise.

Black Book of the EXCHEQUER, is a book under the keeping of the two chamberlains of the exchequer; ſaid to have been compoſed in 1175 by Gervais of Tilbury, nephew of king Henry II. and divided into ſeveral chapters. Herein is contained a deſcription of the court of England, as it then ſtood, its officers, their ranks, privileges, wages, perquiſites, power, and juriſdiction; and the revenues of the crown, both in money, grain, and cattle. Here we find, that for one ſhilling, as much bread might be bought as would ſerve 100 men a whole day; that the price of a fat bullock was only 12 ſhillings, and a ſheep four, &c.

Chancellor of the EXCHEQUER. See CHANCELLOR.

Exchequer-Bills. By ſtatute 5 Ann c. 13. the lord-treaſurers may cauſe exchequer-bills to be made of any ſums not exceeding 1,500,000 l. for the uſe of the war; and the duties upon houſes were made chargeable with 4 l. 10 s. *per cent. per annum* to the bank for circulating them. The bank not paying the bills, actions to be brought againſt the company, and the money and damages recovered: and if any exchequer-bills be loſt, upon affidavit of it before a baron of the exchequer, and certificate from ſuch baron, and ſecurity to pay the ſame if found, duplicates are to be made out: alſo when bills are defaced, new ones ſhall be delivered. The king, or his officers in the exchequer, by former ſtatutes, might borrow money upon the credit of bills, payable on demand, with intereſt after the rate of 3 d. *per diem* for every 100 l. bill. And by 8 & 9 W. 3. c. 20. an intereſt of 5 d. a-day was allowed for every 100 l. But 12 W. 3. c. 1. lowered the intereſt on theſe bills to 4 d. a-day *per cent.* And by 12 Ann. c. 11. it is ſunk to 2 d. a-day.—Forging exchequer bills, or the indorſements thereof, is felony.

EXCISE, (from the Belgic *acciſſe*, tributum, "tribute)," an inland duty or impoſition, paid ſometimes upon the conſumption of the commodity, or frequently upon the wholeſale, which is the laſt ſtage before the conſumption. This is doubtleſs, impartially ſpeaking, the moſt œconomical way of taxing the ſubject; the charges of levying, collecting, and managing the exciſe-duties, being conſiderably leſs in proportion than in other branches of the revenue. It alſo renders the commodity cheaper to the conſumer, than charging it with cuſtoms to the ſame amount would do; for the reaſon juſt now given, becauſe generally paid in a much later ſtage of it. But, at the ſame time, the rigour and arbitrary proceedings of exciſe-laws ſeem hardly compatible with the temper of a free nation. For the frauds that might be committed in this branch of the revenue, unleſs a ſtrict watch is kept, make it neceſſary, wherever it is eſtabliſhed, to give the officers a power of entering and ſearching the houſes of ſuch as deal in exciſeable commodities, at any hour of the day, and, in many caſes, of the night likewiſe. And the proceedings, in caſe of tranſgreſſions, are ſo ſummary and ſudden, that a man may be convicted in two days time in the penalty of many thouſand pounds, by two commiſſioners or juſtices of the peace; to the total excluſion of the trial by jury, and diſregard of the common law. For which reaſon, tho' lord Clarendon tells us, that to his knowledge the earl of Bedford (who was made lord treaſurer by king Charles I. to oblige his parliament) intended to have ſet up the exciſe in England, yet it never made a part of that unfortunate prince's revenue; being firſt introduced, on the model of the Dutch prototype, by the parliament itſelf after its rupture with the crown. Yet ſuch was the opinion of its general unpopularity, that when in 1642 "aſperſions were caſt by malignant perſons upon the houſe of commons, that they intended to introduce exciſes, the houſe for its vindication therein did declare, that theſe rumours were falſe and ſcandalous, and that their authors ſhould be apprehended and brought to condign puniſhment." Its original eſtabliſhment was in 1643, and its progreſs was gradual; being at firſt laid upon thoſe perſons and commodities where it was ſuppoſed the hardſhip would be leaſt perceivable, viz. the makers and venders of beer, ale, cyder, and perry; and the royaliſts at Oxford ſoon followed the example of their brethren at Weſtminſter, by impoſing a ſimilar duty: both ſides proteſting, that it ſhould be continued no longer than to the end of the war, and then be utterly aboliſhed. But the parliament at Weſtminſter ſoon after impoſed it on fleſh, wine, tobacco, ſugar, and ſuch a multitude of other commodities, that it might be fairly denominated *general:* in purſuance of the plan laid down by Mr Pymme (who ſeems to have been the father of the exciſe), in his letter to Sir John Hotham, ſignifying, "that they had proceeded in the exciſe to many particulars, and intended to go on farther; but that it would be neceſſary to uſe the people to it by little and little." And afterwards, when the nation had been accuſtomed to it for a ſeries of years, the ſucceeding champions of liberty boldly and openly declared "the impoſt of exciſe to be the moſt eaſy and indifferent levy that could be laid upon the people;" and accordingly continued it during the whole uſurpation. Upon king Charles's return, it having then been long eſtabliſhed and its produce well known, ſome part of it was given to the crown, in 12 Car. II. by way of purchaſe for the feudal tenures and other oppreſſive parts of the hereditary revenue. But, from its firſt original to the preſent time, its very name has been odious to the people. It has, nevertheleſs, been impoſed on abundance of other commodities in the reigns of king William III. and every ſucceeding prince, to ſupport the enormous expences occaſioned by our wars on the continent. Thus brandies and other ſpirits are now exciſed at the diſtillery; printed ſilks and linens, at the printer's; ſtarch and hair powder, at the maker's; gold and ſilver wire, at the wiredrawer's; all plate whatſoever, firſt in the hands of the vender, who pays yearly for a licence to ſell it, and afterwards in the hands of the occupier, who alſo pays an annual duty for having it in his cuſtody; and coaches and other wheel-carriages, for which the occupier is exciſed; tho' not with the ſame circumſtances of arbitrary ſtrictneſs with regard to plate and coaches as in the other inſtances. To theſe we may add coffee and tea, chocolate and cocoa paſte, for which the duty is paid by the retailer; all artificial wines, commonly called *ſweets;* paper and paſteboard, firſt when made, and again if ſtained or printed; malt, as beforementioned; vinegars; and the manufacture of glaſs; for all which the duty is paid by the manufacturer; hops, for which the perſon that gathers them is anſwerable; candles and ſoap, which are paid for at the maker's; malt liquors brewed for ſale, which are exciſed at the brewery; cyder and perry at the vender's;

Excise.

Blackſt. Comment.

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Exciſion || Excoecaria.

der's; leather and ſkins, at the tanner's; and, lately, tobacco, at the manufacturer's: A liſt, which no friend to his country would wiſh to ſee farther increaſed.

The exciſe was formerly farmed out; but is now managed for the king by commiſſioners in both kingdoms, who receive the whole product of the exciſe, and pay it into the exchequer. Theſe commiſſioners are nine in number in England, and five in Scotland. The former have a ſalary of 1000 l. a-year, the latter 600 l. They are obliged by oath to take no fee or reward but from the king himſelf; and from them there lies an appeal to five other commiſſioners called *commiſſioners of appeals*.

EXCISION, in ſurgery, the cutting out, or cutting off, any part of the body.

Excision, in a ſcripture ſenſe, means the cutting off of a perſon from his people, by way of puniſhment for ſome ſin by him committed. The Jews, Selden informs us, reckon up 36 crimes, to which they pretend this puniſhment is due. The Rabbins reckon three kinds of exciſion; one, which deſtroys only the body; another, which deſtroys the ſoul only; and a third, which deſtroys both body and ſoul. The firſt kind of exciſion they pretend is an untimely death; the ſecond is an utter extinction of the ſoul; and the third, a compound of the two former: thus, making the ſoul mortal or immortal, ſays Selden, according to the degrees of miſbehaviour and wickedneſs of the people.

EXCLAMATION. See Oratory, n° 85.

EXCLUSION, or *Bill of* Exclusion, a bill propoſed about the cloſe of the reign of king Charles II. for excluding the duke of York, the king's brother, from the throne, on account of his being a Papiſt.

EXCLUSIVE, is ſometimes uſed adjectively, thus; *A patent carries with it an excluſive privilege.* Sometimes adverbially: as, *He ſent him all the numbers from* n° 145 *to* n° 247 *excluſive;* that is, all between theſe two numbers, which themſelves were excepted.

EXCOECARIA, in botany: A genus of the triandria order, belonging to the dioecia claſs of plants; and in the natural method ranking under the 38th order, *Tricoccæ*. The male amentum is naked; there is no calyx nor corolla; there are three ſtyles, and a tricoccous capſule. There is but one ſpecies, the agallocha, or aloes-wood, a native of China and ſome of the Indian iſlands, is about the ſame height and form as the olive tree. Its trunk is of three colours, and contains three ſorts of wood: the heart is that of tambac or calombac, which is dearer in the Indies than even gold itſelf. It ſerves to perfume cloaths and apartments; and is eſteemed a ſovereign cordial in fainting fits, a reſtorative in the palſy, and a cure for aſcarides in children. It is burnt as incenſe in the Chineſe and Indian temples; and it is alſo uſed to ſet the moſt precious jewels that are worked in the Indies.

The aloes-wood is very highly valued; and ſtrange fables were invented as to the origin of the tree that yields it; ſome pretending that it grew in Paradiſe, and was only conveyed to us by means of the rivers overflowing their banks and ſweeping off the trees in their way; others affirming that it grew on inacceſſible mountains, where it was guarded by certain wild beaſts, &c. The Siameſe ambaſſadors to the court of France in 1686, who brought a preſent of this wood from their emperor, firſt gave the Europeans any conſiſtent account of it. See *Xylo-Aloes*.

Excommunication.

EXCOMMUNICATION, an eccleſiaſtical penalty or cenſure, whereby ſuch perſons as are guilty of any notorious crime or offence, are ſeparated from the communion of the church, and deprived of all ſpiritual advantages.

Excommunication is founded on a natural right which all ſocieties have, of excluding out of their body ſuch as violate the laws thereof; and it was originally inſtituted for preſerving the purity of the church; but ambitious eccleſiaſtics converted it by degrees into an engine for promoting their own power, and inflicted it on the moſt frivolous occaſions.

The power of excommunication, as well as other acts of eccleſiaſtical diſcipline, was lodged in the hands of the clergy, who diſtinguiſhed it into the *greater* and *leſſer*. The leſſer excommunication, ſimply called *aphoriſmos*, "ſeparation or ſuſpenſion", conſiſted in excluding men from the participation of the euchariſt, and the prayers of the faithful. But they were not expelled the church; for they had the privilege of being preſent at the reading of the Scriptures, the ſermons, and the prayers of the catechumens and penitents. This excommunication was inflicted for leſſer crimes; ſuch as neglecting to attend the ſervice of the church, miſbehaviour in it, and the like.

The greater excommunication, called *panteles aphoriſmos*, "total ſeparation and anathema", conſiſted in an abſolute and entire excluſion from the church and the participation of all its rites. When any perſon was thus excommunicated, notice was given of it by circular letters to the moſt eminent churches all over the world, that they might all confirm this act of diſcipline, by refuſing to admit the delinquent to their communion. The conſequences of this latter excommunication were very terrible. The excommunicated perſon was avoided in civil commerce and outward converſation. No one was to receive him into his houſe, nor eat at the ſame table with him; and when dead, he was denied the ſolemn rites of burial.

The Romiſh pontifical takes notice of three kinds of excommunication, 1. The minor, incurred by thoſe who have any correſpondence with an excommunicated perſon. 2. The major, which falls upon thoſe who diſobey the commands of the holy ſee, or refuſe to ſubmit to certain points of diſcipline; in conſequence of which they are excluded from the church militant and triumphant, and delivered over to the devil and his angels. 3. Anathema, which is properly that pronounced by the pope againſt heretical princes and countries. In former ages, theſe papal fulminations were moſt terrible things; but at preſent, they are formidable to none but a few petty ſtates of Italy.

Excommunication, in the Greek church, cuts off the offender from all communion with the 318 fathers of the firſt council of Nice, and with the ſaints; conſigns him over to the devil and the traitor Judas; and condemns his body to remain after death as hard as a flint or piece of ſteel, unleſs he humbles himſelf and makes atonement for his ſins by a ſincere repentance. The form abounds with dreadful imprecations; and the Greeks aſſert, that if a perſon dies excommunicated, the devil enters into the lifeleſs corpſe; and therefore, in order to prevent it, the relations of the deceaſed cut his

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Excommunication.

his body in pieces, and boil them in wine. It is a cuſtom for the patriarch of Jeruſalem annually to excommunicate the pope and the church of Rome; on which occaſion, together with a great deal of idle ceremony, he drives a nail into the ground with a hammer, as a mark of malediction.

The form of excommunication in the church of England anciently ran thus: "By the authority of God the Father Almighty, the Son and Holy Ghoſt, and of Mary the bleſſed mother of God, we excommunicate, anathematize, and ſequeſter from the pale of holy mother church, &c." The cauſes of excommunication in England are, contempt of the biſhop's court, hereſy, neglect of public worſhip and the ſacraments, incontinency, adultery, ſimony, &c. It is deſcribed to be twofold. The leſs is an eccleſiaſtical cenſure, excluding the party from the participation of the ſacraments: the greater proceeds farther, and excludes him not only from theſe, but from the company of all Chriſtians. But if the judge of any ſpiritual court excommunicates a man for a cauſe of which he hath not the legal cognizance, the party may have an action againſt him at common law, and he is alſo liable to be indicted at the ſuit of the king.

Heavy as the penalty of excommunication is, conſidered in a ſerious light, there are, notwithſtanding, many obſtinate or profligate men, who would deſpiſe the *brutum fulmen* of mere eccleſiaſtical cenſures, eſpecially when pronounced by a petty ſurrogate in the country, for railing or contumelious words, for nonpayment of fees or coſts, or other trivial cauſe. The common law, therefore, compaſſionately ſteps in to their aid, and kindly lends a ſupporting hand to an otherwiſe tottering authority. Imitating herein the policy of the ancient Britons, among whom, according to Ceſar, whoever were interdicted by the druids from their ſacrifices, "In numero impiorum ac ſceleratorum habentur: ab iis omnes decedunt, aditum eorum ſermonemque defugiunt, ne quid ex contagione incommodi accipiant: neque iis petentibus jus redditur, neque honos ullus communicatur." And ſo with us, by the common law, an excommunicated perſon is diſabled to do any act that is required to be done by one that is *probus et legalis homo*. He cannot ſerve upon juries; cannot be a witneſs in any court; and, which is the worſt of all, cannot bring an action, either real or perſonal, to recover lands or money due to him. Nor is this the whole: for if, within 40 days after the ſentence has been publiſhed in the church, the offender does not ſubmit and abide by the ſentence of the ſpiritual court, the biſhop may certify ſuch contempt to the king in chancery. Upon which there iſſues out a writ to the ſheriff of the county, called from the biſhop's certificate a *significavit*; or from its effect, a writ *de excommunicato capiendo*: and the ſheriff ſhall thereupon take the offender and impriſon him in the county jail, till he is reconciled to the church, and ſuch reconciliation certified by the biſhop; upon which another writ *de excommunicato deliberando*, iſſues out of chancery to deliver and releaſe him.

EXCOMMUNICATION was alſo practiſed among the Jews, who uſed to expel from their ſynagogue ſuch as had committed any grievous crime. See the Goſpel according to St John, ix. 22. xii. 42. xvi. 2. And Joſeph. Antiq. Jud. lib. ix. cap. 22. and lib. xvi. cap. 2. Godwyn, in his *Moſes and Aaron*, diſtinguiſhes three degrees, or kinds, of excommunication among the Jews. The firſt he finds intimated in John ix. 22. The ſecond in 1 Cor. v. 5. And the third in 1 Cor. xvi. 22. See NIDDUI.

Excommunication

The rule of the Benedictines gives the name *excommunication* to the being excluded from the oratory, and the common table of the houſe, in our inns of court called *diſcommoning*. This was the puniſhment of ſuch monks as came too late.

EXCOMMUNICATION, or a being ſecluded from a participation in the myſteries of religion, was alſo in uſe under paganiſm.

Such as were thus excommunicated were forbidden to aſſiſt or attend at the ſacrifices, or to enter within the temples; and were afterwards delivered over to the demons and furies of hell, with certain imprecations; which was called among the Romans *diris devovere*. See EXECRATION.

The Druids among the ancient Britons and Gauls, likewiſe, made uſe of excommunication againſt rebels; and interdicted the communion of their myſteries to ſuch as refuſed to acquieſce in their deciſions. See DRUIDS.

EXCORIATION, in medicine and ſurgery, the galling, or rubbing off of the cuticle, eſpecially of the parts between the thighs and about the anus. In adults, it is occaſioned by riding, much walking, or other vehement exerciſe, and may be cured by vulnerary applications. In children there is often an excoriation, not only of the parts near the pudenda, chiefly of the groin and ſcrotum, but likewiſe in the wrinkles of the neck, under the arms, and in other places; proceeding from the acrimony of urine and ſweat; and occaſioning itching pains, crying, watching, reſtleſſneſs, &c. To remedy this, the parts affected may be often waſhed with warm water, and ſprinkled with drying powders, as chalk, hartſhorn, but eſpecially tutty, lapis calaminaris, and ceruſs, which may be tied looſely in a rag, and the powder ſhook out on the parts.

EXCREMENT, whatever is diſcharged out of the body of animals after digeſtion; or the fibrous part of the aliment, mixed with the bile, ſaliva, and other fluids. Urine and the feces are the groſs excrements that are diſcharged out of the bladder or belly. Other excrements are the various humours that are ſecreted from the blood through the different ſtrainers in the body, and which ſerve for ſeveral uſes; ſuch as the ſaliva, ſweat, bile, the pancreatic juice, lymph, the ſemen, nails, the hair, the horns and hoofs of animals.

Excommunication || Excrement.

Alchemiſts, who have ſought every where for their *great work*, as they called it, have particularly operated much on the excrements of men and other animals; but philoſophical chemiſtry has acquired no knowledge from all theſe alchemical labours, from the obſcurity with which their authors have deſcribed them. The philoſophic chemiſts have not much examined animal excrements. Of theſe, Homberg is the only one who has particularly analyſed and examined human ordure; and this was done to ſatisfy an alchemical project of one of his friends, who pretended that from this matter a white oil could be obtained, without ſmell, and capable of fixing mercury into ſilver. The oil was found by Homberg, but mercury was not fixed by it.

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Excreſcence || Excubiæ.

The labours of this able chemiſt were not, however, uſeleſs, like thoſe of the alchemiſts; becauſe he has clearly related the experiments he made on this matter, in the Memoirs of the Academy of Sciences. Theſe experiments are curious, and teach ſeveral eſſential things concerning the nature of excrements. The reſult of theſe experiments is as follows: Freſh human feces, being diſtilled to dryneſs in a water bath, furniſh a clear, watery, inſipid liquor, of a diſagreeable ſmell, but which contains no volatile alkali; which is a proof that this matter, although nearly in a putrefactive ſtate, is not however putrefied; for all ſubſtances really putrid furniſh with this degree of heat a manifeſt volatile alkali*. The dry reſiduum of the foregoing experiment, being diſtilled in a retort with a graduated fire, furniſhes a volatile alkaline ſpirit and ſalt, a fetid oil, and leaves a reſiduous coal. Theſe are the ſame ſubſtances which are obtained from all animal matters.

* See *Putrefaction.*

Human feces, diluted and lixiviated in water, furniſh by filtration and evaporation of the water an oily ſalt of a nitrous nature, which deflagrates like nitre upon ardent coals, and which inflames in cloſe veſſels when heated to a certain degree. This ſame matter yielded to Homberg, who treated it by a complete fermentation or putrefaction, excited by a digeſtion during 40 days in a gentle water-bath heat, and who afterwards diſtilled it, an oil without colour, and without bad ſmell, and ſuch as he endeavoured to find; but which did not, as we ſaid before, fix mercury into ſilver.

EXCRESCENCE, in ſurgery, denotes every preternatural tumour which ariſes upon the ſkin, either in the form of a wart or tubercle. If they are born with a perſon, as they frequently are, they are called *nævi materni*, or marks from the mother; but if the tumour is large, ſo as to depend from the ſkin, like a fleſhy maſs, it is then called a *ſarcoma*. See SURGERY.

EXCRETION, or SECRETION, in medicine, a ſeparation of ſome fluid, mixed with the blood, by means of the glands. Excretions, by which we mean thoſe that evacuate ſuperfluous and heterogeneous humours, purify the maſs of blood: the humours which are generated in the blood are excreted by the glands, and are replaced by a ſufficient quantity of aliment.

EXCRETORY, in anatomy, a term applied to certain little ducts or veſſels, deſtined for the reception of a fluid, ſecreted in certain glandules, and other viſcera, for the excretion of it in the appropriated places.

EXCUBIÆ, in antiquity, the watches and guards kept in the day by the Roman ſoldiers. They are contradiſtinguiſhed from the *vigiliæ* which were kept in the night. The *excubiæ* were placed either at the gates and entrenchments or in the camp; for the latter there was allowed a whole *manipulus* to attend before the *prætorium*, and four ſoldiers to the tent of every *tribune*. The *excubiæ* at the gates of the camp, and at the entrenchments, were properly called *ſtationes*. One company of foot and one troop of horſe were aſſigned to each of the four gates every day. To deſert their poſt, or abandon their corps of guards, was an unpardonable crime.

The *triarii*, as the moſt honourable order of ſoldiers, were excuſed from the ordinary watches; yet being placed oppoſite to the *equites*, they were obliged to have an eye over them.

Exculpation || Execution.

LETTERS *of* EXCULPATION, in Scots law, a writ or ſummons iſſued by authority of the court of juſticiary, at the inſtance of a pannel, for citing witneſſes to prove his defences, or his objections to any of the jury or witneſſes cited againſt him.

EXCUSATI, in church hiſtory, a term uſed to denote ſlaves, who flying to any church for ſanctuary, were excuſed and pardoned by their maſters; but theſe were obliged to take an oath to that purpoſe before they could have them again; and, if they broke the oath, they were puniſhed and fined as perſons guilty of perjury.

EXEAT, in church-diſcipline, a Latin term, uſed for a permiſſion which a biſhop grants a prieſt to go out of his dioceſe; or an abbot to a religious to go out of his monaſtery.

The word is alſo uſed in ſeveral great ſchools for leave given a ſcholar or ſtudent to go out. His maſter has given him an exeat.

EXECRATION, in antiquity, a kind of puniſhment, conſiſting of direful curſes and marks of infamy: ſuch was that uſed againſt Philip king of Macedon by the Athenians. A general aſſembly of the people being called, they made a decree, that all the ſtatues and images of that king, and of all his anceſtors, ſhould be demoliſhed, and their very name razed; that all the feſtivals, ſacred rites, prieſts, and whatever elſe had been inſtituted in honour of him, ſhould be profaned; that the very places where there had been any monument or inſcription to his honour, ſhould be deteſtable; that nothing ſhould be ſet up, or dedicated in them, which could be done in clean places; and, laſtly, that the prieſts, as often as they prayed for the Athenian people, allies, armies, and fleets, ſhould as many times deteſt and execrate Philip, his children, kingdom, land and ſea forces, and the whole race and name of the Macedonians.

At the taking and demoliſhing of cities, it was uſual amongſt the Jews, Greeks, and Romans, to pronounce curſes upon, and load with direful execrations, the rebuilders of them.

EXECUTION, in a general ſenſe, the act of accompliſhing, finiſhing, or atchieving any thing.

EXECUTION, in law, the completing or finiſhing ſome act, as of judgment, deed, &c. and it uſually ſignifies the obtaining poſſeſſion of any thing recovered by judgment of law.

Sir Edward Coke obſerves, that there are two ſorts of executions: the one final; and the other a quouſque, that tends to an end. An execution final, is that which makes money of the defendant's goods; or extends to his lands, and delivers them to the plaintiff, who accepts the ſame in ſatisfaction; and this is the end of the ſuit, and the whole that the king's writ requires to be done. The writ of execution with a quouſque, tho' it tends to an end, yet is not final, as in the caſe of a *capias ad ſatisfac.* where the defendant's body is to be taken, in order that the plaintiff may be ſatisfied for his debt. See CAPIAS.

Executions are either in perſonal, real, or mixed actions. In a perſonal action, the execution may be made three

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Execution. three ways, *viz.* by the writ of *capias ad ſatisfaciendum*, againſt the body of the defendant; *fieri facias*, againſt his goods; or *elegit*, againſt his lands. See *Fieri Facias* and Elegit.

In a real and mixed action, the execution is by writ of *habere facias ſaſinam* and *habere poſſeſſionem.** Writs of execution bind the property of goods only from the time of delivery of the writ to the ſheriff; but the land is bound from the day of the judgment obtained: and here the ſale of any goods for valuable conſideration, after a judgment, and before the execution awarded, will be good. It is otherwiſe as to lands, of which execution may be made, even on a purchaſe after the judgment, though the defendant ſell ſuch land before execution. Likewiſe, ſheriffs may deliver in execution all the lands whereof others ſhall be ſeiſed in truſt for him, againſt whom execution is had on a judgment, &c.

* See *Habere.*

When any judgment is ſigned, the execution may be taken out immediately thereon; but if it be not iſſued within a year and a day after, where there is no fault in the defendant, as in the caſe of an injunction, writ of error, &c. there muſt be a *ſcire facias*, to revive the judgment; though, if the plaintiff ſues out any writ of execution within the year, he may continue it after the year is expired. After judgment againſt the defendant, in an action wherein ſpecial bail is given, the plaintiff is at liberty to have execution againſt ſuch defendant, or againſt his bail: but this is underſtood where the defendant does not render himſelf, according to law, in ſafeguard of the bail: and execution may not regularly be ſued forth againſt a bail, till a default is returned againſt the principal: alſo if the plaintiff takes the bail, he ſhall never take the principal. It is held that an execution may be executed after the death of the defendant: for his executor, being privy thereto, is liable as well as the teſtator. The executor is an entire thing, ſo that he who begins muſt end it: therefore, a new ſheriff may diſtrain an old one, to ſell the goods ſeized on a diſtringas, and to bring the money into court.

† See *Judgment.*

Execution, in criminal caſes, the completion of human puniſhment. This follows judgment †; and muſt in all caſes, capital as well as otherwiſe, be performed by the legal officer, the ſheriff or his deputy; whoſe warrant for ſo doing was anciently by precept under the hand and ſeal of the judge, as it is ſtill practiſed in the court of the lord high ſteward, upon the execution of a peer: though, in the court of the peers in parliament, it is done by writ from the king. Afterwards it was eſtabliſhed, that in caſe of life, the judge may command execution to be done without any writ. And now the uſage is, for the judge to ſign the kalendar or liſt of all the priſoners names, with their ſeparate judgments in the margin, which is left with the ſheriff. As, for a capital felony, it is written oppoſite to the priſoner's name, "let him be hanged by the neck;" formerly, in the days of Latin and abbreviation, "*ſuſ. per coll.*" for "*ſuſpendatur per collum.*" And this is the only warrant that the ſheriff has for ſo material an act as taking away the life of another. It may certainly afford matter of ſpeculation, that in civil cauſes there ſhould be ſuch a variety of writs of execution to recover a trifling debt, iſſued in the king's name, and under the ſeal of the court, without which the ſheriff cannot legally ſtir one ſtep; and yet that the execution of a man, the moſt important and terrible taſk of any, ſhould depend upon a marginal note. Execution.

Blackſt. Comment.

The ſheriff, upon receipt of his warrant, is to do execution within a convenient time; which in the country is alſo left at large. In London, indeed, a more ſolemn and becoming exactneſs is uſed, both as to the warrant of execution and the time of executing thereof: for the recorder, after reporting to the king in perſon the caſe of the ſeveral priſoners, and receiving his royal pleaſure, that the law muſt take its courſe, iſſues his warrant to the ſheriffs, directing them to do execution on the day and at the place aſſigned. And in the court of king's bench, if the priſoner be tried at the bar, or brought there by *habeas corpus*, a rule is made for his execution; either ſpecifying the time and place, or leaving it to the diſcretion of the ſheriff. And, throughout the kingdom, by ſtatute 25 Geo. II. c. 37. it is enacted that, in caſe of murder, the judge ſhall in his ſentence direct execution to be performed on the next day but one after ſentence paſſed. But, otherwiſe, the time and place of execution are by law no part of the judgment. It has been well obſerved, that it is of great importance that the puniſhment ſhould follow the crime as early as poſſible; that the proſpect of gratification or advantage, which tempts a man to commit the crime, ſhould inſtantly awake the attendant idea of puniſhment. Delay of execution ſerves only to ſeparate theſe ideas; and then the execution itſelf affects the minds of the ſpectators rather as a terrible ſight, than as the neceſſary conſequence of tranſgreſſion.

The ſheriff cannot alter the manner of the execution, by ſubſtituting one death for another, without being guilty of felony himſelf. It is held alſo by Sir Edward Coke and Sir Matthew Hale, that even the king cannot change the puniſhment of the law, by altering the hanging or burning into beheading; though, when beheading is part of the ſentence, the king may remit the reſt. And, notwithſtanding ſome examples to the contrary, Sir Edward Coke ſtoutly maintains, that *judicandum eſt legibus, non exemplis.* But others have thought, and more juſtly, that this prerogative, being founded in mercy, and immemorially exerciſed by the crown, is part of the common law. For hitherto, in every inſtance, all theſe exchanges have been for more merciful kinds of death; and how far this may alſo fall within the king's power of granting conditional pardons (*viz.* by remitting a ſevere kind of death, on condition that the criminal ſubmits to a milder) is a matter that may bear conſideration. It is obſervable, that when Lord Stafford was executed for the popiſh plot in the reign of King Charles II. the then ſheriffs of London, having received the king's writ for beheading him, petitioned the Houſe of Lords for a command or order from their lordſhips, how the ſaid judgment ſhould be executed: for, he being proſecuted by impeachment, they entertained a notion (which is ſaid to have been countenanced by Lord Ruſſel), that the king could not pardon any part of the ſentence. The lords reſolved, that the ſcruples of the ſheriffs were unneceſſary; and declared, that the king's writ ought to be obeyed. Diſappointed of raiſing a flame in that aſſembly, they immediately ſignified to the Houſe of Commons by one of the members, that they were not ſatisfied as to the power of the ſaid writ. That houſe

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Execution || Exedræ.

took two days to consider of it; and then sullenly resolved, that the house was *content* that the sheriff do execute Lord Stafford by severing his head from his body. It is farther related, that when afterwards the same Lord Russel was condemned for high treason upon indictment, the king, while he remitted the ignominious part of the sentence, observed, "that his Lordship would now find he was possessed of that prerogative, which in the case of Lord Stafford he had denied him." One can hardly determine (at this distance from those turbulent times), which most to disapprove of, the indecent and sanguinary zeal of the subject, or the cool and cruel sarcasm of the sovereign.

To conclude: it is clear, that if, upon judgment to be hanged by the neck till he is dead, the criminal be not thoroughly killed, but revives, the sheriff must hang him again. For the former hanging was no execution of the sentence; and, if a false tenderness were to be indulged in such cases, a multitude of collusions might ensue. Nay, even while abjurations were in force, such a criminal, so reviving, was not allowed to take sanctuary and abjure the realm; but his fleeing to sanctuary was held an escape in the officer.

EXECUTION, in the law of Scotland. See LAW, Part III. n° clxxxv. 52. clxxxvi. 15.

EXECUTION, in the French music, is used to denote the manner of singing, or of the performance of a song. "As to the manner of singing, called in France *execution*, no nation may, with any probability, dispute it with the French. If the French, by their commerce with the Italians, have gained a bolder composition, the Italians have made their advantage of the French, in learning of them a more polite, moving, and exquisite execution." St Evremond.

EXECUTIVE POWER. The supreme executive power of these kingdoms is vested by our laws in a single person, the king or queen for the time being. See the article KING.

The executive power, in this state, hath a right to a negative in parliament, *i. e.* to refuse assent to any acts offered; otherwise the other two branches of legislative power would, or might, become despotic.

EXECUTOR, a person nominated by a testator, to take care to see his will and testament executed or performed, and his effects disposed of according to the tenor of the will. See LAW.

EXECUTOR, in Scots law, signifies either the person intitled to succeed to the moveable estate of one deceased, or who by law or special appointment is intrusted with the administration of it.

EXECUTORY, in law, is where an estate in fee, that is made by deed or fine, is to be executed afterwards by entry, livery, or writ. Leases for years, annuities, conditions, &c. are termed *inheritances executory*.

EXECUTRY, in Scots law, is the moveable estate falling to the executor. Under executry, or moveables, is comprehended every thing that moves itself, or can be moved; such as corns, cattle, furniture, ready money, &c.

EXEDRÆ, in antiquity, denoted halls with many seats, where the philosophers, rhetoricians, and men of learning, met for discourse and disputation. The words occurs in ecclesiastical writers as a general name for such buildings as were distinct from the main body of the churches, and yet within the limits of the church taken in its largest sense. Among the exedræ the chief was the BAPTISTERY.

Exegesis || exercise.

EXEGESIS, a discourse by way of explanation or comment upon any subject. In the Scotch universities, there is an exercise among the students in divinity, called an *exegesis*, in which a question is stated by the respondent, who is then opposed by two or three other students in their turns; during which time the professor moderates, and solves the difficulties which the respondent cannot overcome.

EXEGETES, (formed of ἐξηγέομαι "I explain,") among the Athenians, persons learned in the laws, whom the judges used to consult in capital causes.

EXEGETICA, in algebra, the art of finding, either in numbers or lines, the roots of the equation of a problem, according as the problem is either numerical or geometrical.

EXEMPLAR, a model, or original, to be imitated, or copied. See MODEL.

EXEMPLAR also denotes the idea, or image, conceived or formed in the mind of the artist, whereby he conducts his work. Such is the idea of Cæsar, which a painter has in his mind when he goes to make a picture of Cæsar.

EXEMPLIFICATION *of letters Patent*, denotes an exampler, or copy of letters patent, made from the inrolment thereof, and sealed with the great seal of England. Such exemplifications are as effectual to be showed, or pleaded, as the letters patent themselves.

EXEMPTION, in law, a privilege to be free from some service or appearance: thus, barons and peers of the realm are, on account of their dignity, exempted from being sworn upon inquests; and knights, clergymen, and others, from appearing at the sheriff's turn. Persons of 70 years of age, apothecaries, &c. are also by law exempted from serving on juries; and justices of the peace, attorneys, &c. from parish-offices.

EXERCISE, among physicians, such an agitation of the body as produces salutary effects in the animal economy.

Exercise may be said to be either active or passive. The active is walking, hunting, dancing, playing at bowls, and the like; as also speaking, and other labour of the body and mind. The passive is riding in a coach, on horseback, or in any other manner. Exercise may be continued to a beginning of weariness, and ought to be used before dinner in a pure light air; for which reason, journeys, and going into the country, contribute greatly to preserve and re-establish health.

Exercise increases the circulation of the blood, attenuates and divides the fluids, and promotes a regular perspiration, as well as a due secretion of all the humours; for it accelerates the animal spirits, and facilitates their distribution into all the fibres of the body, strengthens the parts, creates an appetite, and helps digestion. Whence it arises, that those who accustom themselves to exercise are generally very robust, and seldom subject to diseases.

Boerhaave recommends bodily exercise in diseases of a weak and lax fibre. By riding on horseback, says his commentator, the pendulous viscera of the abdomen are shaken every moment, and gently rubbed as

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Exercise. it were one againſt another, while in the mean time the pure air acts on the lungs with greater force. But it is to be obſerved that a weak man ſhould not ride with a full ſtomach, but either before dinner, or after the digeſtion is near finiſhed; for when the ſtomach is diſtended, weak people do not bear theſe concuſſions of the horſe without difficulty; but when the primæ viæ are near empty, the remaining feces are diſcharged by this concuſſion. Sailing in a ſhip is alſo an exerciſe of great uſe to weak people. If the veſſel moves with an even motion, by increaſing perſpiration it uſually excites a wonderful alacrity, creates an appetite, and promotes digeſtion. Theſe exerciſes are more eſpecially ſerviceable to weak people; but, in order to ſtrengthen the body by muſcular motion, running, and bodily exerciſes, are to be uſed. In theſe we ſhould begin with the moſt gentle, ſuch as walking, and increaſe it by degrees till we come to running. Thoſe exerciſes of the body are more eſpecially ſerviceable which give delight to the mind at the ſame time, as tennis, fencing, &c.; for which reaſon, the wiſdom of antiquity appointed rewards for thoſe who excelled in theſe gymnaſtic exerciſes, that by this means the bodies of their youth might be hardened for warlike toils.

As nothing is more conducive to health than moderate exerciſe, ſo violent exerciſe diſſipates the ſpirits, weakens the body, deſtroys the elaſticity of the fibres, and exhauſts the fluid parts of the blood. No wonder, then, that acute and mortal fevers often ariſe from too violent exerciſe of the body; for the motion of the venous blood towards the heart being quickened by the contraction of the muſcles, and the veins being thus depleted, the arteries more eaſily propel their contained humours through the ſmalleſt extremities into the now leſs reſiſting veins; and therefore the velocity of the circulation will be increaſed through all the veſſels. But this cannot be performed without applying the humours oftener, or in a greater quantity, to the ſecretory organs in the ſame time, whence the more fluid parts of the blood will be diſſipated, and what remains will be inſpiſſated; and by the greater action of the veſſels upon their contained fluids, and of the reacting fluids upon the veſſels, the blood acquires an inflammatory denſity. Add to this, that by the violent attrition of the ſolids and fluids, together with the heat thence ariſing, all the humours will incline to a greater acrimony, and the ſalts and oils of the blood will become more acrid and volatile. Hence, ſays Boerhaave, thoſe fevers which ariſe from too much exerciſe or motion, are cured by reſt of body and mind, with ſuch aliments and medicines as moiſten, dilute, and ſoften or allay acrimony.

The exerciſe of a ſoldier in camp, conſidered as conducive to health, Dr Pringle diſtinguiſhes into three heads; the firſt relating to his duty, the ſecond to his living more commodiouſly, and the third to his diverſions. The firſt, conſiſting chiefly in the exerciſe of his arms, will be no leſs the means of preſerving health than of making him expert in his duty: and frequent returns of this, early, and before the ſun grows hot, will be made more advantageous than repeating it ſeldom, and ſtaying out long at a time; for a camp affording little convenience for refreſhment, all unneceſſary fatigue is to be avoided. As to the ſecond article, cutting boughs for ſhading the tents, making trenches round them for carrying off the water, airing the ſtraw, cleaning their clothes and accoutrements, and aſſiſting in the buſineſs of the meſs, ought to be no diſagreeable exerciſe to the men for ſome part of the day. Laſtly, as to diverſions, the men muſt be encouraged to them either by the example of their officers, or by ſmall premiums to thoſe who ſhall excel in any kind of ſports as ſhall be judged moſt conducive to health: but herein great caution is neceſſary, not to allow them to fatigue themſelves too much, eſpecially in hot weather or ſickly times; but above all, that their cloaths be kept dry, wet clothes being the moſt frequent cauſes of camp-diſeaſes. Exerciſe.

Exercise, in military affairs, is the ranging a body of ſoldiers in form of battle, and making them perform the ſeveral motions and military evolutions with different management of their arms, in order to make them expert therein. See alſo Words *of Command*.

Exercise, in the royal navy, is the preparatory practice of managing the artillery and ſmall arms, in order to make the ſhip's crew perfectly ſkilled therein, ſo as to direct its execution ſucceſsfully in the time of battle.

The exerciſe of the great guns was, till lately, very complicated, and abounding with ſuperfluities, in our navy, as well as all others. The following method was then ſucceſsfully introduced by an officer of diſtinguiſhed abilities.

1ſt, Silence.
2d, Caſt looſe your guns.
3d, Level your guns.
4th, Take out your tompions.
5th, Run out your guns.
6th, Prime.
7th, Point your guns.
8th, Fire.
9th, Spunge your guns.
10th, Load with cartridge.
11th, Shot your guns.
12th, Put in your tompions.
13th, Houſe your guns.
14th, Secure your guns.

Upon beat-to-arms (every body having immediately repaired to their quarters) the midſhipman commanding a number of guns, is to ſee that they are not without every neceſſary article, as (at every gun) a ſpunge, powder-horn with its priming wires, and a ſufficient quantity of powder, crow, hand ſpike, bed, quoin, train-tackle, &c. ſending without delay for a ſupply of any thing that may be amiſſing; and for the greater certainty of not overlooking any deficiency, he is to give ſtrict orders to each captain under him, to make the like examination at his reſpective gun, and to take care that every requiſite is in a ſerviceable condition, which he is to report accordingly. And (beſides the other advantages of this regulation) for the ſtill more certain and ſpeedy account being taken upon theſe occaſions, the midſhipman is to give each man his charge at quarters (as expreſſed in the form of the monthly report), who is to ſearch for his particular implements, and, not finding them, is immediately to acquaint his captain, that, upon his report to the midſhipman, they may be replaced.

The man who takes care of the powder is to place himſelf on the oppoſite ſide of the deck from that where

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Exercise. where we engage, except when fighting both ſides at once, when he is to be amid-ſhips. He is not to ſuffer any other man to take a cartridge from him but he who is appointed to ſerve the gun with that article, either in time of a real engagement or at exerciſe.

Lanthorns are not to be brought to quarters in the night, until the midſhipman gives his orders for ſo doing to the perſon he charges with that article. Every thing being in its place, and not the leaſt lumber in the way of the guns, the exerciſe begins with,

1. "Silence." At this word every one is to obſerve a ſilent attention to the officers.

2. "Caſt looſe your guns." The muzzle laſhing is to be taken off from the guns, and (being coiled up in a ſmall compaſs) is to be made faſt to the eye-bolt above the port. The laſhing-tackles at the ſame time to be caſt looſe, and middle of the breeching ſeized to the thimble of the pomillion. The ſponge to be taken down, and, with the crow, hand-ſpike, &c. laid upon the deck by the gun. N. B. When prepared for engaging an enemy, the ſeizing within the clinch of the breeching is to be cut, that the gun may come ſufficiently within-board for loading, and that the force of the recoil may be more ſpent before it acts upon the breeching.

3. "Level your guns." The breech of your metal is to be raiſed ſo as to admit the foot of the bed's being placed upon the axle-tree of the carriage, with the quoin upon the bed, both their ends being even one with the other. N. B. When levelled for firing, the bed is to be laſhed to the bolt which ſupports the inner end of it, that it may not be thrown out of its place by the violence of the gun's motion when hot with frequent diſcharges.

4. "Take out your tompions." The tompion is to be taken out of the gun's mouth, and left hanging by its laniard.

5. "Run out your guns." With the tackles hooked to the upper bolts of the carriage, the gun is to be bowſed out as cloſe as poſſible, without the aſſiſtance of crows or hand-ſpikes; taking care at the ſame time to keep the breeching clear of the trucks, by hauling it through the rings; it is then to be bent ſo as to run clear when the gun is fired. When the gun is out, the tackle-falls are to be laid along-ſide the carriages in neat fakes, that, when the gun by recoiling overhauls them, they may not be ſubject to get foul, as they would if in a common coil.

6. "Prime." If the cartridge is to be pierced with the priming-wire, and the vent filled with powder, the pan alſo is to be filled; and the flat ſpace, having a ſcore through it at the end of the pan, is to be covered, and this part of the priming is to be bruiſed with the round part of the horn. The apron is to be laid over, and the horn hung up out of danger from the flaſh of the priming.

7. "Point your guns." At this command the gun is, in the firſt place, to be elevated to the height of the object, by means of the ſide-ſights; and then the perſon pointing is to direct his fire by the upper ſight, having a crow on one ſide and a hand-ſpike on the other, to heave the gun by his direction till he catches the object.

N. B. The men who heave the gun for pointing are to ſtand between the ſhip's ſide and their crows or hand-ſpikes, to eſcape the injury they might otherwiſe receive from their being ſtruck againſt them, or ſplintered by a ſhot; and the man who attends the captain with a match is to bring it at the word, "Point your guns," and kneeling upon one knee oppoſite the train-truck of the carriage, and at ſuch a diſtance as to be able to touch the priming, is to turn his head from the gun, and keep blowing gently upon the lighted match to keep it clear from aſhes. And as the miſſing of an enemy in action, by neglect or want of coolneſs, is moſt inexcuſable, it is particularly recommended to have the people thoroughly inſtructed in pointing well, and taught to know the ill conſequences of not taking proper means to hit their mark; wherefore they ſhould be made to elevate their guns to the utmoſt nicety, and then to point with the ſame exactneſs, having caught the object through the upper ſight. At the word, Exercise.

8. "Fire." The match is inſtantly to be put to the bruiſed part of the priming; and when the gun is diſcharged, the vent is to be cloſed, in order to ſmother any ſpark of fire that may remain in the chamber of the gun; and the man who ſponges is immediately to place himſelf by the muzzle of the gun in readineſs; when, at the next word,

9. "Spunge your gun." The ſponge is to be rammed down to the bottom of the chamber, and then twiſted round, to extinguiſh effectually any remains of fire; and, when drawn out, to be ſtruck againſt the out-ſide of the muzzle, to ſhake off any ſparks or ſcraps of the cartridge that may have come out with it; and next, its end is to be ſhifted ready for loading; and while this is doing, the man appointed to provide a cartridge is to go to the box, and by the time the ſponge is out of the gun, he is to have it ready; and at the word,

10. "Load with cartridge." The cartridge (with the bottom end firſt, ſeam downwards, and a wad after it) is to be put into the gun, and thruſt a little way within the mouth, when the rammer is to be entered: the cartridge is then to be forcibly rammed down; and the captain at the ſame time is to keep his priming-wire in the vent, and, feeling the cartridge, is to give the word *home*, when the rammer is to be drawn, and not before. While this is doing, the man appointed to provide a ſhot is to provide one (or two, according to the order at that time) ready at the muzzle, with a wad likewiſe; and when the rammer is drawn, at the word,

11. "Shot your guns." The ſhot and wad upon it are to be put into the gun, and thruſt a little way down, when the rammer is to be entered as before. The ſhot and wad are to be rammed down to the cartridge, and there have a couple of forcible ſtrokes; when the rammer is to be drawn, and laid out of the way of the guns and tackles, if the exerciſe or action is continued; but if it is over, the ſponge is to be ſecured in the place it is at all times kept in.

12. "Put in your tompions." The tompions to be put into the muzzle of the cannon.

13. "Houſe your guns." The ſeizing is to be put on again upon the clinched end of the breeching, leaving it no ſlacker than to admit of the guns being houſed with eaſe. The quoin is to be taken from under the breech of the gun, and the bed, ſtill reſting upon

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Exercise. upon the bolt, within the carriage, thruſt under, till the foot of it falls off the axle-tree, leaving it to reſt upon the end which projects out from the foot. The metal is to be let down upon this. The gun is to be placed exactly ſquare; and the muzzle is to be cloſe to the wood, in its proper place for paſſing the muzzle-laſhings.

14. "Secure your guns." The muzzle-laſhings muſt firſt be made ſecure, and then with one tackle (having all its parts equally taught with the breeching) the gun is to be laſhed. The other tackle is to be bowſed taught, and by itſelf made faſt, that it may be ready to caſt off for laſhing a ſecond breeching. N. B. Care muſt be taken to hook the firſt tackle to the upper bolt of the carriage, that it may not otherwiſe obſtruct the reeving of the ſecond breeching, and to give the greater length to the end part of the fall. No pains muſt be ſpared in bowſing the laſhing very taught, that the gun may have the leaſt play that is poſſible, as their being looſe may be productive of very dangerous conſequences. The quoin, crow, and hand-ſpike, are to be put under the gun, the powder-horn hung up in its place, &c.

Being engaged at any time when there is a large ſwell, a rough ſea, or in ſqually weather, &c. as the ſhip may be liable to be ſuddenly much heeled, the port-tackle fall is to be kept clear, and (whenever the working of the gun will admit of it) the man charged with that office is to keep it in his hand; at the ſame time the muzzle-laſhing is to be kept faſt to the ring of the port, and, being hauled taught, is to be faſtened to the eye-bolt over the port-hole, ſo as to be out of the gun's way in firing, in order to haul it in at any time of danger.

This precaution is not to be omitted, when engaging to the windward, any more than when to the lee-ward, thoſe ſituations being very ſubject to alter at too ſhort a warning.

A train-tackle is always to be made uſe of with the lee-guns; and the man ſtationed to attend it is to be very careful in preventing the guns running out at an improper time.

Exercise, may alſo be applied with propriety to the forming our fleets into orders of ſailing, lines of battle, &c. an art which the French have termed *evolutions*, or *tactiques*. In this ſenſe exerciſe may be defined, the execution of the movements which the different orders and diſpoſition of fleets occaſionally require, and which the ſeveral ſhips are directed to perform by means of ſignals. See Tactics.

Exercises, are alſo underſtood of what young gentlemen learn in the academies and riding-ſchools, ſuch as fencing, drawing, riding the great horſe, &c.

How uſeful, how agreeable ſoever, ſtudy may be to the mind, it is very far from being equally ſalutary to the body. Every one obſerves, that the Creator has formed an intimate connection between the body and the mind; a perpetual action and reaction, by which the body inſtantly feels the diſorders of the mind, and the mind thoſe of the body. The delicate ſprings of our frail machines loſe their activity and become enervated. and the veſſels are choaked by obſtructions when we totally deſiſt from exerciſe, and the conſequences neceſſarily affect the brain: a more ſtudious and ſedentary life is therefore equally prejudicial to the body and the mind. The limbs likewiſe become ſtiff; we contract an aukward conſtrained manner; a certain diſguſtful air attends all our actions, and we are very near being as diſagreeable to ourſelves as to others. An inclination to ſtudy is highly commendable; but it ought not, however, to inſpire us with an averſion to ſociety. The natural lot of man is to live among his fellows: and whatever may be the condition of our birth, or our ſituation in life, there are a thouſand occaſions where a man muſt naturally deſire to render himſelf agreeable; to be active and adroit; to dance with a grace; to command the fiery ſteed; to defend himſelf againſt a brutal enemy; to preſerve his life by dexterity; as by leaping, ſwimming, &c. Many rational cauſes have therefore given riſe to the practice of particular exerciſes; and the moſt ſagacious and benevolent legiſlators have inſtituted, in their academies and univerſities, proper methods of enabling youth, who devote themſelves to ſtudy, to become expert alſo in laudable exerciſes. Exercitor of Exeter.

EXERCITOR, in Scots law, he who employs a ſhip in trade, whether he be owner, or only freights her from the owner.

EXERGESIA. See Oratory, n° 90.

EXERGUM, among antiquarians, a little ſpace around or without the figures of a medal, left for the inſcription, cipher, device, date, &c.

EXETER, the capital city of Devonſhire, ſituated on the river Ex, ten miles north of the Britiſh channel: W. Long. 3. 40. N. Lat. 50. 44. Anciently the name of this city was *Iſex*, and *Iſca Dumnoniorum*. The preſent name is a contraction of *Exceſter*, that is, a city upon the Ex. It is large, populous, and wealthy, with gates, walls, and ſuburbs: the circumference of the whole is about three miles. It is the ſee of a biſhop, transferred hither from Crediton, by Edward the Confeſſor; and is one of the principal cities in the kingdom for its buildings, wealth, and number of its inhabitants. It had ſix gates, beſides many turrets, ſeveral of which are now pulled down. It had formerly ſo many convents, that it was called *Monk-town*, till king Athelſtan changed its name to Exeter, about the year 940; at which time he alſo fortified the city (which had before been only incloſed with a ditch and a fence of timber) with circular walls, embattlements, towers, and turrets of ſquared ſtone, encircling the whole, except the weſtern ſide, with a deep moat. Beſides chapels and 5 large meeting-houſes, there are now 15 churches within the walls, and 4 without. St Peter's, the cathedral, is a magnificent pile; though little now remains of the ancient fabric of the church, except that part which is called *Our Lady's Chapel*. It has a ring of 12 bells, reckoned the largeſt ring of the largeſt bells in England; as is alſo its organ, whoſe largeſt pipes are 15 inches in diameter. In 1763 the cathedral was repaired, beautified, and new paved; when, in removing the old pavement, was found the leaden coffin of biſhop Bitton, who died in 1307; the top of which, being decayed, afforded an opportunity of viewing the ſkeleton lying in its proper form: near the bones of the finger was found a ſapphire ring ſet in gold; the ſtone conſiderably large, but of no great value, on account

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Exeter. of ſeveral flaws in it. Near this ſtood a ſmall neat chalice and patten of ſilver gilt, but the damp had deſtroyed the greateſt part of the gilding. In the centre of the patten was engraved a hand, with the two fore-fingers extended in the attitude of benediction. The top of the crozier was alſo found, but totally decayed. A moſt beautiful modern painted glaſs window has been lately erected at the weſtern end of the cathedral, the eaſtern end having before a remarkable fine antique one. In the other windows there is much fine ancient painted glaſs. The altar is remarkable for its beautiful deſign and execution. On the left-hand ſide of it there yet exiſts the ſeat where Edward the Confeſſor and his queen ſat and inſtalled Leofricus his chancellor, the firſt biſhop of Exeter; and in the ſouth croſs aiſle is the monument of the ſame Leofricus, who died 1073, which at the time of his interment was a part of the church-yard, but by the enlarging of the church by his ſucceſſors became nearly the middle of the building. The grand weſtern end of the church is moſt magnificently adorned with the ſtatues of the patriarchs, &c. The Chapter-houſe was built in 1439. The beautiful throne for the biſhop was conſtructed about 1466, and is ſaid to be the grandeſt of the kind in Britain. The great north tower was completed in 1485, which contains a bell that weighs 12,500 pounds; and exceeds the great Tom of Lincoln by 2,500 pounds. This city has had divers charters granted, or confirmed, by moſt of our kings; but it was made a mayor town in the reign of King John, and a county of itſelf by king Henry VIII. It is governed by a mayor, 24 aldermen, 4 bailiffs, a recorder, chamberlain, ſheriff, town-clerk, &c. They have a ſword-bearer, and four ſtewards, four ſerjeants at mace wearing gowns, and ſtaff-bearers in liveries with ſilver badges. It had anciently a mint; and in the reigns of king William III. and queen Anne, many pieces of ſilver money were coined here, which have the letter E under the buſt. Here are 12 or 13 incorporate city-companies. All pleas and civil cauſes are tried by the mayor, recorder, aldermen, and common council; but criminal cauſes, and thoſe relating to the peace, are determined by eight aldermen, who are juſtices of the peace. Here are four principal ſtreets, all centring in the middle of the city, which is therefore called *Carfox*, from the old Norman word *Quatre voix*, i. e. the four ways. Near it is a conduit, lately removed from the centre to the ſide of the principal ſtreet, which was firſt erected by William Duke, mayor of the city, in the reign of Edward IV. and there are others well ſupplied with water brought in pipes from the neighbourhood. There is an old caſtle in the north-eaſt part of the city, called *Rougemont*, from the red ſoil it ſtands on; from thence there is a pleaſant proſpect from the walls. It is ſuppoſed to have been built by the Weſt Saxon kings, and that they reſided here, as did afterwards the earls and dukes of Cornwall. This caſtle was remarkably ſtrong both by nature and art. The gate, which originally led into it, was walled up by order of William the Conqueror, in token of his having reduced it to his obedience after a very obſtinate reſiſtance; and cloſe by it an inferior gate was made in the wall, in which ſtate they both remain. The outward ſtone-facing is kept in tolerable repair; but the inſide, being but earth, is gradually crumbled down. Here yet remains the ancient chapel, built in 1260, and kept in good repair, where prayers are read and a ſermon preached in ſeſſions weeks. The city itſelf is healthy, and pleaſantly ſituated on the ſides of a hill, having other hills to its N. W. and S. by which it is ſheltered from the force of ſtorms. The bank which ſuſtained the ditch that in a great part ſurrounded the caſtle, is planted and gravelled, and accommodated with ſeats, it being the place of reſort for walking for the inhabitants; and the ditch between it and the caſtle being filled up, is now thickly planted with elms, which form a delightful grove. The old palace is now entirely demoliſhed, and an elegant ſeſſions-houſe erected, where the aſſizes, quarter-ſeſſions, and county-courts are held. In the city and ſuburbs are priſons both for debtors and malefactors; a workhouſe, alms-houſes, and charity-ſchools; an hoſpital for the ſick and lame poor of the city and county, upon the model of the infirmaries of London and Weſtminſter; and two free grammar-ſchools. It has markets on Wedneſdays and Fridays; and four fairs in the year. Great trade is carried on here for ſerges, perpetuanas, long-ells, and other woollen goods, in which it is computed that at leaſt 600,000l. a-year is traded for; yet no markets were erected here for wool, yarn, and kerſeys, till the 30th of Henry VIII. Before that time, the merchants drove a conſiderable trade to Spain and France: they were incorporated, in the reign of Queen Mary I. by the name of "The governor, conſuls, and ſociety of merchant adventurers, trading to France." Here is alſo a weekly ſerge market, the greateſt in England, next to the Brigg market at Leeds in Yorkſhire: it is ſaid that ſome weeks as many ſerges have been ſold here as amount to 80,000l. or 100,000l.; for beſides the vaſt quantities of their woollen goods ſhipped for Portugal, Spain, and Italy, the Dutch give large commiſſions for buying up ſerges, perpetuanas, &c. for Holland and Germany. It is particularly remarked of this city, that it is almoſt as full of gentry as of tradeſmen; and that more of its mayors and bailiffs have deſcended from, or given riſe to, good families, than in any other city of its bigneſs in the kingdom; for the great trade and flouriſhing ſtate of this city tempted gentlemen to ſettle their ſons in it, contrary to the practice of many of the inland as well as northern counties, where, according to the vain and ruinous notion of the Normans, trade was deſpiſed by the gentry, as fit only for mechanics and the vulgar. The city was under the juriſdiction of the Romans, whoſe coins have been frequently dug up in and about it. After they left England, the Saxons drove the Britons out of it into Cornwall, and encompaſſed it with a ditch, beſides bulwarks. The Danes attacked and ſpoiled it in 875; and afterwards, in revenge of the general maſſacre of the Danes by the Engliſh, Swain, one of their kings, came hither with a great force, put the men to the ſword, raviſhed the women, maſſacred the children, burnt the city, and defaced the walls. A long time after this, juſt as it was reviving, William the Conqueror beſieged and took it; and it was again beſieged in the reigns of king Stephen and Edward IV. In the reign of Henry VII. it was again beſieged by Perkin Warbeck, and battered furiouſly: but the citizens forced him to raiſe the Exeter.

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Exeter. siege; which ſo pleaſed the king, that he came hither, and preſented a cap of maintenance to the city, and gave the very ſword from his ſide to be borne always before the mayor. In the reign of Edward VI. in July 1544, it was ſmartly cannonaded by the rebels of Cornwall and Devon, who almoſt ſtarved it by breaking down its bridges, cutting off its water, and ſtopping up all paſſages; but it held out till the lord John Ruſſel came with a force and raiſed the ſiege on the 6th of Auguſt, which was then appointed as an anniverſary day of thankſgiving by the city, and is ſtill obſerved as ſuch. King Charles I.'s queen, to whom this city gave ſhelter in the civil wars, was here delivered of Henrietta, afterwards ducheſs of Orleans; whoſe picture is in its Guild-Hall, as are alſo General Monk's and George I.'s, &c. In the ſouth-eaſt quarter of the city was a houſe called *Bedford-houſe*, wherein the above queen was delivered of the princeſs. This having lately been taken down, an elegant circus is built on the ſpot, with a theatre adjoining it; and for the conveniency of the inhabitants, a paſſage has been made through the town-wall to Southern Hay, on which green ſtands the county hoſpital, already ſpoken of, beſides a conſiderable number of new buildings. There are remains of ſeveral ancient ſtructures, which are daily giving way to modern erections; among the reſt, an old building, ſaid to have been a palace of king Athelſtan. The Guildhall is a ſpacious and convenient building, whoſe front or portico projects a great way into the ſtreet, and was firſt erected in 1330, to which its preſent front was rebuilt in 1593, and repaired in 1720. An arm of the ſea formerly flowed nearly up to the city's wall, till 1316, when Hugh Courtenay earl of Devon, in revenge for an affront, ruined the navigation, by conſtructing weare and dams in the river; but to remedy it, in 1539, an act of parliament paſſed for making a navigable canal, for the better conveyance of goods in barges to and from the city to Topſham. This was carried into execution in 1581, but not completed till 1675; nor was it after all found ſufficient, till the preſent haven was conſtructed in 1697, when it was rendered capable of bringing ſhips of 150 tons quite to the quay, conſtructed near the walls of the city. In ſhort, Exeter, by a conſtant adherence to its motto, *Semper fidelis*, has been applauded by all hiſtorians for its inviolable fidelity to its ſovereigns, whether they held their crown by hereditary or parliamentary right. The city ſends two members to parliament; and gives title of Earl to the Cecils.—The ſee of Exeter was once one of the moſt wealthy in the kingdom; but its revenues were moſt ſhamefully waſted by biſhop Voyſey, who alienated its lands. What little he left was ſo much incumbered, that the ſee has never been able to recover its former grandeur; and ſo ſmall are its preſent revenues, that it has been found neceſſary for the biſhop to hold ſome other preferment for the better ſupport of his dignity and rank. This ſee hath yielded to the nation three lord chancellors, two lord treaſurers, one lord preſident of Wales, and one chancellor to the univerſity of Oxford. The dioceſe contains the entire counties of Devonſhire and Cornwall, wherein are 604 pariſhes, whereof 239 are impropriate. It hath four archdeacons, viz. of Cornwall, Exeter, Barnſtable, and Totneſs. The dioceſe was formerly valued in the king's books at L. 1556: 14: 6¾ but, ſince biſhop Voyſey's time, it is lowered to L. 500, and is computed to be worth annually L. 2700. The clergy's tenth is L. 1200: 15: 2½. To the cathedral belong a biſhop, a dean, four archdeacons, a chancellor, a treaſurer, a chantor, 24 prebendaries, and other inferior officers and ſervants.

Exfoliation || Exhibition.

EXFOLIATION, a term uſed by ſurgeons for the ſcaling of a bone, or its riſing and ſeparating into thin laminæ or ſcales.

EXHALATION, a general term for all effluvia or ſteams raiſed from the ſurface of the earth in form of vapour.

EXHAUSTIONS, in mathematics. Method of exhauſtions, is a way of proving the equality of two magnitudes, by a *reductio ad abſurdum*; ſhowing, that if one be ſuppoſed either greater or leſs than the other, there will ariſe a contradiction.

The method of exhauſtions was of frequent uſe among the ancient mathematicians; as Euclid, Archimedes, &c. It is founded on what Euclid ſays in his tenth book; *viz.* that thoſe quantities whoſe difference is leſs than any aſſignable quantity, are equal; for if they were unequal, be the difference never ſo ſmall, yet it may be ſo multiplied, as to become greater than either of them; if not ſo, then it is really nothing. This he aſſumes in the proof of prop. 1. book x. which imports, that if, from the greater of two quantities, you take more than its half, and from the remainder more than its half, and ſo continually, there will, at length, remain a quantity leſs than either of thoſe propoſed. On this foundation it is demonſtrated, that if a regular polygon of infinite ſides be inſcribed in, or circumſcribed about, a circle; the ſpace, which is the difference between the circle and the polygon, will, by degrees, be quite exhauſted, and the circle become equal to the polygon.

EXHEREDATION, in the civil law, with us ordinarily called *diſinheriting*, is the father's excluding his ſon from inheriting his eſtate.

There are 14 cauſes of exheredation expreſſed in Juſtinian's Novel; without ſome one of which cauſes, he decrees the exheredation null, and the teſtament inofficious, as the civilians call it. Indeed, by the ancient Roman law, the father might pronounce exheredation without any cauſe; but the rigour of this law was reſtrained and moderated by Juſtinian.

EXHIBIT, in law, is where a deed, or other writing, being produced in a chancery ſuit to be proved by witneſſes, the examiner, or commiſſioner appointed for the examination of any ſuch, certifies on the back of the deed or writing, that the ſame was ſhown to the witneſs at the time of his examination, and by him ſworn to.

EXHIBITION, in law, a producing, or ſhowing, of titles, authorities, and other proofs, of a matter in conteſt.

Anciently they uſed the phraſe, *exhibition* of a tragedy, comedy, or the like; but now we ſay *repreſentation* in lieu thereof.

Exhibition, in our old writers, is uſed for an allowance of meat and drink, ſuch as was cuſtomary among the religious appropriators of churches, who uſually made it to the depending vicar. The benefactions ſettled for the maintaining of ſcholars in the univerſities, not depending on the foundation, are alſo called *exhibitions*.

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Exhortation ‖ Exocoetus.

EXHORTATION, in rhetoric, differs only from *suasion*, in that the latter principally endeavours to convince the understanding, and the former to work on the affections.

EXHUMATION, (of *ex* "out of," and *humus* "ground)," the act of digging up a body interred in holy ground, by the authority of the judge. In France, the exhumation of a dead body is ordered, upon proof that he was killed in a duel. By the French laws, a parson has a right to demand the exhumation of the body of one of his parishioners, when interred out of the parish without his consent.

EXIGENCE, or EXIGENCY, that which a thing requires, or which is expedient and suitable thereto.

EXIGENT, in law, a writ which lies where the defendant in a personal action cannot be found, nor any effects of his within the county, by which he may be attached or distrained.

EXIGENTERS, four officers in the court of common-pleas, who make all exigents and proclamations, in all actions where process of outlawry lies. Writs of supersedeas, as well as the prothonotaries, upon exigents, were likewise drawn up in their office.

EXILE. See BANISHMENT.

Among the Romans, the word *exilium* properly signified an interdiction or exclusion from water and fire; the necessary consequence of which was, that the interdicted person must betake himself into some other country, since there was no living without fire and water.—Thus Cicero, *ad Herenn.* observes, that the form of the sentence did not express *exilium*, but only *aquæ & ignis interdictio*. The same author remarks, that exile was not properly a punishment, but a voluntarily flying or avoiding the punishment decreed: *Exilium non esse supplicium, sed perfugium, portusque supplicii*. He adds, that there was no crime among the Romans, as among other nations, punished with exile; but exile was a resource to which people flew voluntarily, in order to avoid chains, ignominy, starving, &c.

The Athenians frequently sent their generals and great men into exile, out of envy of their merits, or distrust of their too great authority. See OSTRACISM.

EXISTENCE, that whereby any thing has an actual essence, or is said to *be*. See the article METAPHYSICS.

EXIT, properly expresses the departure of a player from off the stage, when he has acted his part. The word is also used in a figurative sense, to express any kind of departure, even death.

EXITERIA, in antiquity, oblations or prayers to any of the gods for a prosperous expedition or journey. There were also feasts under this denomination, which were celebrated by the Greeks with sacrifices and prayers, when their generals undertook expeditions against any enemy.

EXOCOETUS, or the FLYING-FISH, in ichthyology, a genus belonging to the order of abdominales. The head is scaly, and it has no teeth; it has 10 radii in the branchiostege membrane; the body is whitish, and the belly is angular: the pectoral fins, the instruments of flight, are very large. When pursued by any other fish, it raises itself from the water by means of these long fins, and flies in the air to a considerable distance, till the fins dry, and then it falls down into the water. It is a fish that seems to lead a most miserable life. In its own element, it is perpetually harassed by the dorados and other fish of prey. If it endeavours to avoid them by having recourse to the air, it either meets its fate from the gulls or the albatrosses, or is forced down again into the mouth of the inhabitants of the water, who, below, keep pace with its aerial excursion. This fish is caught in the Mediterranean and some other seas. It is most common between the tropics, and there its enemies are more particularly numerous. In these climates the flying fishes spring out of the water by hundreds, to escape the rapacity of the dolphins, sharks, &c. When flying, they have as formidable enemies to encounter with in that element, viz. the pelican, eagle, diomedea, &c. and frequently throw themselves on board the ships to escape their pursuit. Their flesh is said to be palatable and nourishing food.

Plate CLXXXVII.

Exodiary ‖ Exorcism.

EXODIARY, in the ancient Roman tragedy, was the person who, after the drama or play was ended, sung the EXODIUM.

EXODIUM, in the ancient Greek drama, one of the four parts or divisions of tragedy, being so much of the piece as included the catastrophe and unravelling of the plot, and answering nearly to our fourth and fifth acts.

EXODIUM, among the Romans, consisted of certain humorous verses rehearsed by the exodiary at the end of the Fabulæ Atellanæ.

EXODIUM, in the Septuagint, signifies the end or conclusion of a feast. Particularly it is used for the eighth day of the feast of tabernacles, which, it is said, had a special view to the commemoration of the *exodus* or departure out of Egypt.

EXODUS, a canonical book of the Old Testament; being the second of the pentateuch, or five books of Moses.

It is so called from the Greek [*exodos*], the "going out" or departure of the children of Israel from the land of Egypt; the history of which is delivered in this book, together with the many miracles wrought on that occasion.

EXOMPHALUS, in surgery, called also *omphalocele*, and *hernia umbilicalis*, is a preternatural tumor of the abdomen, at the navel, from a rupture or distension of the parts which invest that cavity.

EXORCISM, the expelling of devils from persons possessed, by means of conjurations and prayers. The Jews made great pretences to this power. Josephus tells several wonderful tales of the great success of several exorcists. One Eleazer, a Jew, cured many dæmoniacs, he says, by means of a root set in a ring. This root, with the ring, was held under the patient's nose, and the devil was forthwith evacuated. The most part of conjurors of this class were impostors, each pretending to a secret nostrum or charm which was an overmatch for the devil. Our Saviour communicated to his disciples a real power over dæmons, or perhaps over the diseases said to be occasioned by dæmons. See DÆMONIAC.

Exorcism makes a considerable part of the superstition of the church of Rome, the rituals of which forbid the exorcising any person without the bishop's leave. The ceremony is performed at the lower end of the church, towards the door. The exorcist first signs the possessed person with the sign of the cross, makes him kneel,

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Exorcists || Exotic

kneel, and ſprinkles him with holy water. Then follow the litanies, pſalms, and prayer; after which the exorciſt aſks the devil his name, and adjures him by the myſteries of the Chriſtian religion not to afflict the perſon any more: then, laying his right hand on the dæmoniac's head, he repeats the form of exorciſm, which is this: "I exorciſe thee, unclean ſpirit, in the name of Jeſus Chriſt: tremble, O Satan! thou enemy of the faith, thou foe of mankind, who haſt brought death into the world; who haſt deprived men of life, and haſt rebelled againſt juſtice; thou ſeducer of mankind, thou root of evil, thou ſource of avarice, diſcord, and envy." The Romaniſts likewiſe exorciſe houſes and other places, ſuppoſed to be haunted by unclean ſpirits; and the ceremony is much the ſame with that for perſons poſſeſſed.

EXORCISTS, in church-hiſtory, an order of men, in the ancient church, whoſe employment it was to exorciſe or caſt out devils. See the preceding article.

EXORDIUM, in oratory, is the preamble or beginning, ſerving to prepare the audience for the reſt of the diſcourſe.

Exordiums are of two kinds; either juſt and formal, or vehement and abrupt. The laſt are moſt ſuitable on occaſions of extraordinary joy, indignation, or the like. See ORATORY, n° 26.

EXOSTOSIS (from ἐξ *out*, and ὀστέον *a bone*), in anatomy, an acute eminence or excreſcence, puſhing preternaturally above the bone.

EXOTERIC and ESOTERIC, are terms denoting *external* and *internal*, and applied to the double doctrine of the ancient philoſophers: the one was public or *exoteric*; the other ſecret, or *eſoteric*. The firſt was that which they openly profeſſed and taught to the world; the latter was confined to a ſmall number of choſen diſciples. This method was derived originally from the Egyptians; who, according to the united teſtimony of Herodotus, Diodorus Siculus, Strabo, Plutarch, &c. had a twofold philoſophy, one ſecret and ſacred, another public and common. The ſame practice alſo obtained among the Perſian Magi, the Druids of the Gauls, and the Brachmans of India. The Egyptian prieſts, with whom it originated, ſuſtained the character of judges and magiſtrates, and probably introduced this diſtinction with a view to the public welfare, and to ſerve the purpoſes of legiſlation and government. Clement of Alexandria informs us, that they communicated their myſteries principally to thoſe who were concerned in the adminiſtration of the ſtate; and Plutarch confirms the ſame declaration. However, others have ſuppoſed that they invented the fables of their gods and heroes, and the other external ceremonies of their religion, to diſguiſe and conceal natural and moral truths; but whatever was the motive of their practice, it was certainly applied to political purpoſes.

EXOTIC, a term properly ſignifying *foreign* or *extraneous*, i. e. brought from a remote or ſtrange country. In which ſenſe we ſometimes ſay *exotic* or *barbarous terms* or *words*, &c. The word is derived from the Greek ἔξω, ἔξωθεν *extra*, "without, on the outſide."

EXOTIC, is chiefly applied to plants which are natives of foreign countries, particularly thoſe brought from the Eaſt and Weſt Indies, and which do not naturally grow in Europe.

The generality of exotics, or exotic plants, do not thrive in England without ſome peculiar care and culture; they require the warmth of their own climates; whence the uſe of hot-beds, glaſs-frames, green houſes, &c. See *GREEN-Houſe* and STOVE. Expanſion

EXPANSION, among metaphyſicians, denotes the idea we have of laſting diſtance, all whoſe parts exiſt together.

EXPANSION, in phyſiology, the enlargement or increaſe of bulk in bodies, chiefly by means of heat. This is one of the moſt general effects of that ſubtile principle, being common to all bodies whatever, whether ſolid or fluid. In ſome few caſes, indeed, bodies ſeem to expand as they grow cold, as water in the act of freezing: but this is found to be owing to the extrication of an infinite number of air-bubbles from the fluid at a certain time; and is not at all a regular and gradual expanſion like that of metals, or any other ſolid or fluid ſubſtance by means of heat. In certain metals alſo, an expanſion takes place when they paſs from a fluid to a ſolid ſtate: but this too is not to be accounted any proper effect of cold, but of the arrangement of the parts of the metals in a certain manner; and is therefore to be accounted a kind of cryſtallization rather than any thing elſe.

The expanſion of bodies by heat is very various, and in ſolids does not ſeem to be guided by any certain rule. In the 48th volume of the Philoſophical Tranſactions, Mr Smeaton has given a table of the expanſions of many different ſubſtances, from which the following particulars are extracted. The degree of heat employed was 180 degrees of Fahrenheit's thermometer, and the expanſion is expreſſed in 10,000th-parts of an Engliſh inch.

A foot of white glaſs barometer tube	100
Martial regulus of antimony	130
Biſtered ſteel	138
Hard ſteel	147
Iron	151
Biſmuth	167
Hammered copper	204
A mixture of three parts of copper with one of tin	218
Caſt braſs	225
A mixture of 16 parts of braſs with one of tin	229
Braſs wire	232
Speculum metal	232
Spelter ſolder, compoſed of two parts of braſs and one of zinc,	247
Fine Pewter	274
Grain tin	298
Soft ſolder, compoſed of two parts of lead and one of tin,	301
A mixture of eight parts of zinc and one of tin, a little hammered,	323
Lead	344
Zinc or ſpelter	353
Zinc hammered an inch *per* foot	373

From this table it appears, that no rule can be deduced concerning the degree of expanſion to which bodies are ſubject by the ſame degree of heat, either from their ſpecific gravity or otherwiſe. Zinc, which is much lighter than lead, expands more with heat; but glaſs, which is lighter than either, expands much leſs; whilſt

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Expanſion ſ Expectation.

while copper, which is heavier than a mixture of braſs and tin, expands leſs.

Of all known ſubſtances, thoſe of the aerial kind expand moſt by an equal degree of heat; and in general the greater quantity of latent heat that any ſubſtance contains, the more eaſily is it expanded; though even here we cannot form any general rule. It is certain, however, that the moſt denſe fluids, ſuch as mercury, oil of vitriol, &c. are leſs expanſible than water, ſpirit of wine, or ether. This laſt indeed is ſo eaſily expanded, that were it not for the preſſure of the atmoſphere it would be in a continual ſtate of vapour. After bodies are reduced to a vaporous ſtate, their expanſion ſeems to go on without any limitation, in proportion to the degree of heat applied; ſo that it is impoſſible to ſay what would be the ultimate effects of that principle upon them in this way. The force with which theſe vapours expand on the application of high degrees is very great; neither can we ſay, that any obſtacle whatever is inſuperable by them. On this principle depend the ſteam-engines ſo much uſed in various mechanical operations; likewiſe ſome hydraulic machines; and the inſtruments called *manometers*, which ſhow the variation of gravity in the external atmoſphere, by the expanſion or condenſation of a ſmall quantity of air confined in a proper veſſel. On this principle alſo perpetual movements might be conſtructed ſimilar to thoſe invented by Mr Coxe, on the principle of the barometer. A variety of other curious machines may be conſtructed on the principle of aerial expanſion; of which an account is given under the articles HYDROSTATICS and PNEUMATICS.

The expanſion of ſolid bodies is meaſured by an inſtrument named the PYROMETER; and the force with which they expand is ſtill greater than that of aerial vapours, the flame of a farthing candle producing an expanſion in a bar of iron capable of counteracting a weight of 500 pounds. The quantity of expanſion, however, is ſo ſmall, that it has never been applied to the movement of any mechanical engine. On the principle of the expanſion of fluids THERMOMETERS are conſtructed; for an account of which, ſee that article. For the effects of the different expanſions of metals in correcting the errors of machines for meaſuring time, ſee the article PENDULUM.

EXPECTANCY, ESTATES IN, are of two ſorts; one created by act of the parties, called a *remainder*; the other, by act of law, called a *reverſion*.

EXPECTATION, in the doctrine of chances, is applied to any contingent event, and is capable of being reduced to the rules of computation. Thus a ſum of money in expectation, when a particular event happens, has a determinate value before that event happens; ſo that if a perſon is to receive any ſum, *e. gr.* 10l. when an event takes place which has an equal probability of happening and failing, the value of the expectation is half that ſum or 5l. and in all caſes the expectation of obtaining any ſum is eſtimated by multiplying the value of the ſum expected by the fraction which repreſents the probability of obtaining it. The expectation of a perſon who has three chances in five of obtaining 100l. is equal to $\frac{3}{5} \times 100$ or 60l. and the probability of obtaining 100l. in this caſe is equal to $\frac{60}{100} = \frac{3}{5}$.

Expectorants ‖ Experiment.

EXPECTORANTS, in pharmacy, medicines which promote EXPECTORATION.

EXPECTORATION, the act of evacuating or bringing up phlegm or other matters out of the trachea, lungs, &c. by coughing, hauking, ſpitting, &c.

EXPEDITATION, in the foreſt-laws, ſignifies a cutting out the balls of a dog's fore-feet for the preſervation of the king's game.

Every one that keeps any great dog not expeditated forfeits three ſhillings and fourpence to the king. In maſtiffs, not the ball of the feet, but the three claws, are to be cut to the ſkin. Inſtit. part iv. p. 308.

This expeditation was to be performed once in every three years, and was done to every man's dog who lived near the foreſt, and even the dogs of the foreſters themſelves.

EXPEDITION, the march of an army to ſome diſtant place, with a view of hoſtilities. Such were the expeditions of Cyrus againſt Xerxes, and of Bacchus and Alexander into the Indies.

Expeditions for the recovery of the Holy Land were called *croiſades*.

EXPERIENCE, a kind of knowledge acquired by long uſe without any teacher. It conſiſts in the ideas of things we have ſeen or read, which the judgment has reflected on, to form for itſelf a rule or method.

Authors make three kinds of experience: The firſt is the ſimple uſes of the external ſenſes, whereby we perceive the phenomena of natural things without any direct attention thereto, or making any application thereof. The ſecond is, when we premeditately and deſignedly make trials of various things, or obſerve thoſe done by others, attending cloſely to all effects and circumſtances. The third is that proceeded by a foreknowledge, or at leaſt an apprehenſion of the event, and determines whether the apprehenſion were true or falſe; which two latter kinds, eſpecially the third, are of great ſervice in philoſophy.

EXPERIMENT, in philoſophy, is the trial of the reſult or effect of the applications and motions of certain natural bodies, in order to diſcover ſomething of their motions and relations, whereby to aſcertain ſome of their phenomena or cauſes.

EXPERIMENTAL PHILOSOPHY,

IS that which has its foundation in experience, wherein nothing is aſſumed as a truth but what is founded upon ocular demonſtration, or which cannot be denied without violating the common ſenſe and perceptions of all mankind.

In former times philoſophers, when reaſoning about natural things, inſtead of following this method, aſſumed ſuch principles as they imagined ſufficient for explaining the phenomena, without conſidering whether theſe principles were juſt or not. Hence for a great

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great number of ages no progreſs was made in ſcience; but ſyſtems were heaped upon ſyſtems, having neither conſiſtency with one another nor with themſelves. No proper explanations indeed were given of any thing; for all theſe ſyſtems, when narrowly examined, were found to conſiſt merely in changes of words, which were often very abſurd and barbarous. The firſt who deviated from this method of philoſophiſing, if we may call it by that name, was Friar Bacon, who lived in the 16th century, and who ſpent 2000 l. (an immenſe ſum in thoſe days) in making experiments. The admirable Crichton, who flouriſhed about the year 1580, not only diſputed againſt the philoſophy of Ariſtotle, which had for ſo long been in vogue, but wrote a book againſt it. Cotemporary with this celebrated perſonage was Francis Bacon lord chancellor of England, who is looked upon to be the founder of the preſent mode of philoſophiſing by experiments. But though others might lay the foundation, Sir Iſaac Newton is juſtly allowed to have brought this kind of philoſophy to perfection; and to him we are certainly indebted for the greateſt part of it. Unfortunately, however, neither Lord Bacon nor Sir Iſaac Newton had an opportunity of knowing many important facts relating to the principles of fire and electricity, which have ſince been brought to light. Hence all their philoſophy was merely mechanical, or derived from the viſible operations of ſolid bodies, or of the groſſer fluids upon one another. In ſuch caſes therefore, where the more ſubtile and active fluids were concerned, they fell into miſtakes, or were obliged to deny the exiſtence of the principles altogether, and to make uſe of terms which were equally unintelligible and incapable of conveying any information with thoſe of their predeceſſors. A remarkable inſtance of the errors into which they were thus betrayed, we have in the doctrine of projectiles, where the moſt enormous deviations from truth were ſanctified by the greateſt names of the laſt century, merely by reaſoning from the reſiſtance of the air to bodies moving ſlowly and viſibly, to its reſiſtance to the ſame bodies when moved with high degrees of velocity*. In other caſes they were reduced to make uſe of words to expreſs immechanical powers, as attraction, repulſion, rarefaction, &c. which have ſince tended in no ſmall degree to embarraſs and confound ſcience by the diſputes that have taken place concerning them. The foundations of the preſent ſyſtem of experimental philoſophy are as follow.

* See *Gunnery*.

I. All the material ſubſtances of which the univerſe is compoſed are called *natural bodies*. What we perceive uniform and invariable in theſe ſubſtances we call their *properties*. Some of theſe are general and common to all matter, as extenſion; others are proper to particular ſubſtances, for inſtance fluidity; while ſome appear to be compounded of the general and particular properties, and thus belong to a ſtill ſmaller number; as the properties of air, which are derived from the general property of extenſion combined with thoſe of fluidity, elaſticity, &c.

II. In taking a particular review of the properties of bodies, we naturally begin with that of *extenſion*. This manifeſts itſelf by the three dimenſions of length, breadth, and thickneſs. Hence proceeds the diviſibility of matter; which the preſent ſyſtem ſuppoſes to reach even to infinity: but though this propoſition be ſupported by mathematical demonſtrations, it is impoſſible we can either have any diſtinct idea of it, or of the oppoſite doctrine, which teaches that matter is compoſed of exceſſively minute particles called *atoms*, which cannot be divided into ſmaller ones. The ſubtilty indeed to which ſolid bodies may be reduced by mechanical means is very ſurpriſing; and in ſome caſes is ſo great, that we might be tempted to ſuppoſe that a farther diviſion is impoſſible. Thus, in grinding a ſpeculum, the inequalities of its ſurface are ſo effectually worn off, that the whole becomes in a certain degree inviſible, ſhowing not itſelf by the light which falls upon it, but the image of other bodies; but the ſmalleſt ſcratch which diſturbs the equality of the ſurface is at once diſtinctly viſible.

III. From the arrangement of theſe ultimate particles of matter, whatever we ſuppoſe them to be, ariſe the various figures of bodies: and hence figure is a property of all bodies no leſs univerſal than extenſion, unleſs we chooſe to ſpeak of the ultimate particles of matter, which, as they are ſuppoſed to be deſtitute of parts, muſt conſequently be equally deſtitute of figure; and the ſame conſequence will follow whether we adopt this ſuppoſition or the other. The figures of bodies are ſo extremely various and diſſimilar, that it is impoſſible to find any two perfectly alike. It is indeed the next thing to impoſſible to find two in which the diſſimilarity may not be perceived by the naked eye; but if any ſuch ſhould be found, the microſcope will quickly diſcover the imbecility of our ſenſes in this reſpect. Solidity is another property eſſential to all matter. By this we mean that property which one quantity of matter has of excluding any other from the ſpace which itſelf occupies at that time. Hence ariſes what we call *reſiſtance*, which is always an indication of ſolidity; and no leſs ſo in thoſe bodies which we call *fluid* than in thoſe which are the moſt ſolid. This may at firſt ſeem to be a contradiction; but fluids yield only when they can get away from the preſſure; in all other caſes they reſiſt as violently as the moſt ſolid bodies. Thus water confined in a tube will as effectually reſiſt the impreſſion of a piſton thruſt down upon it as though it were the moſt ſolid ſubſtance. Air indeed will yield for a certain time; but this, as appears from ſeveral experiments, is entirely owing to a more ſubtile fluid, viz. that of elementary fire being preſſed out from among its particles. As long as this fluid can be forced out, either from among the particles of air, water, or any other more groſs fluid ſubſtance, the latter will be found compreſſible, as a heap of wet ſand would be by ſqueezing the water out from it: but when we come to the moſt ſubtile of all elements, ſuch as we ſuppoſe that of fire to be, there cannot be any poſſibility of compreſſing it, even though we had a veſſel ſo cloſe as to prevent it from eſcaping through its ſides; becauſe its parts are already as near each other as they can be.

IV. The diſtance of the parts of bodies from each other is what we call their poroſity, and was formerly ſuppoſed to be owing to a vacuum interſperſed between them; but now it is generally allowed that the pores of ſolid bodies as well as of fluids are filled with an extremely ſubtile matter which pervades all nature. The poroſity of bodies with regard to one another may be thus explained. Wood, or a ſponge, is porous with regard.

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regard to water; but water itself is porous with regard to air, which it absorbs in considerable quantity. Both air and water are porous with regard to the element of fire, which produces very considerable changes upon them, according to the quantity of it they contain, or the manner it acts in their pores. This element itself, however, is not porous with regard to any other substance. Its pores, therefore, if it has any, must be absolute vacuities destitute of any matter whatever. Vacuities of this kind indeed are supposed to be absolutely necessary to motion: for though we may say, matter being divisible almost *ad infinitum*, that a body or substance more solid may move in another substance that is more subtile, and that will give way to its motion, we must nevertheless have recourse to a last resort, and admit of an ultimate vacuum, which will give room sufficient to the least corpuscle, that its part *A* may take the place of its part *B* without the least resistance: besides, it is not to be imagined, that nature, in fact, admits of that infinite divisibility which our imagination can conceive, and that every thing which is possible in idea, is at all times practicable. All that exists is possible, but all that is possible does not however exist. By density, is understood the proportion between the extension and solidity of a body: one body therefore is more dense than another, when, under the same degree of extension, it contains more solid matter: and this quality arises from condensation and compression. Elasticity is nothing more than that effort by which certain bodies, when compressed, endeavour to restore themselves to their former state; and this property supposes them compressible. As all these natural properties of bodies are of great utility in explaining the principles of physics and in applying them to all the arts, experimental philosophy proves their reality by a thousand examples.

V. We discover still other properties in bodies; such as mobility, which we must not here confound with motion. This mobility arises from certain dispositions which are not in an equal degree in all bodies: from whence it comes that some are more easily moved than others: and this proceeds from the resistance to motion which is perceived in all bodies, having regard merely to their masses; and this resistance is called *vis inertiæ*, or *inert force*. A body is said to be in motion when it is actually moving from one place to another; or, whenever a body changes its situation with regard to the objects that surround it, either nearly or remotely, it is said to be in motion. There are three principal matters to be considered in a moving body; its direction, its velocity, and the quantity of its motion: and here physics explains the force or moving power; it likewise distinguishes between simple and compound motion. Simple motion is that which arises from only one force, or which tends to only one point. It describes the laws, and explains the resistance, of mediums; the resistance of friction; the difficulties of a perpetual motion; the alteration of direction occasioned by the opposition of a fluid matter; reflected or reverberated motion; the communication of motion by the shock of bodies, &c. Compound motion is that of a body impelled to move by several causes or powers which act according to their different directions. Physics here likewise investigates the laws of motion; and is particularly applied to the explaining, under this head, what are called the *central forces*, which produce a motion that is either circular or in a curve line, and which incessantly urge the moving body either to approach or recede from the centre. To distinguish these from each other, the former is called the *centripetal force*, and the latter the *centrifugal force*.

VI. By gravity, or ponderosity, is to be understood that force which occasions bodies to pass from a higher to a lower place, when nothing opposes their course, or when the obstacles are not sufficient to stop them. Speculative philosophy investigates its cause, and perhaps in vain. Experimental philosophy contents itself with describing the phenomena, and teaching the laws of gravity, which are thoroughly established by a thousand reiterated experiments. In order properly to understand this subject, we must take care not to confound the term *gravity* with that of *weight*. By the former, we understand that force which urges bodies to descend through a certain space in a given time. By the latter, is meant the quantity of a heavy body that is contained under the same bulk. The phenomena are explained by the experiments themselves, and by inferences deduced from them.

VII. Hydrostatics is a science of which the object is the gravity and equilibrium of fluids in particular. Though the gravity of these bodies is the same with that of others, and is subject to the same laws, yet their state of fluidity gives rise to particular phenomena, which it is of consequence to know. But as hydrostatics cannot be successfully treated on without the assistance of calculation, it has been ranked among the mathematical sciences.

VIII. We say the same with regard to mechanics; which is the art of employing, by the aid of machines, the motion of bodies, in conformity to its properties and laws, as well with regard to solids as fluids, either more commodiously or more advantageously.

IX. After it has made the most accurate experiments, and the most judicious observations, on all these different subjects, and the properties of bodies in particular, Experimental Philosophy passes to the examination of the air, the water, fire, the wind, colours, &c. The air is a fluid with which we are surrounded from the instant of our birth, and without which we cannot exist. It is by the properties and the influences of the air, that nature gives increase and perfection to all that it produces for our wants and conveniencies; it is the spirit of navigation: sound, voice, speech itself, are nothing more than percussions of the air: this globe that we inhabit is completely surrounded by air; and this kind of coverture, which is commonly called the *atmosphere*, has such remarkable functions, that it evidently appears to concur to the mechanism of nature. Experimental physics, therefore, considers the air, 1. Of itself, independent of its bulk, and the figure of its whole body: it examines its essential properties; as its gravity, density, spring, &c. The air-pump is here of indispensable use; and by this machine physics examines in what manner space, or a vacuum, is made. It likewise shows the necessity of air to the preservation of animal-life; the effect it has on sound, fire, and gunpowder, *in vacuo*; and a hundred other experiments of various degrees of curiosity. 2. It considers the air as the terrestrial atmosphere, sometimes as a fluid at rest, and sometimes as in motion.

And

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And by these means it accounts for the variation of the mercury in the barometer, and why it sinks in proportion as the height of the atmosphere diminishes; as also for the figure, the extent, and weight of the atmosphere: it shows the method of determining the height of mountains, the nature of sound in general, of its propagation, and of sonorous bodies. The late discoveries of Dr Priestley and others have added a new and very considerable branch to experimental philosophy in this respect, of which an account is given under the article AEROLOGY.

X. It is here also, that experimental philosophy considers the nature of the wind; which is nothing more than agitated air, a portion of the atmosphere that moves like a current, with a certain velocity and determinate direction. This fluid, with regard to its direction, takes different names according to the different points of the horizon from whence it comes, as east, west, north, and south. Winds are likewise distinguished into three sorts; one of which is called *general* or *constant*, as the trade-winds which continually blow between the tropics: another is the *periodical*, which always begin and end within a certain time of the year, or a certain hour of the day, as the monsoons, the land-breezes and sea-breezes, which arise constantly in the morning and evening; and lastly, such as are *variable*, as well with regard to their direction as their velocity and duration.

M. Mariotte computes the velocity of the most impetuous wind to be at the rate of 32 feet in a second, and Mr Derham makes it 66 feet in the same time. The first, doubtless, meant the wind of the greatest velocity that had then come to his knowledge. The invention of aerostatic machines has tended more to show the real velocity of the wind than any other invention as yet made public: but all of them move slower than the aerial current; so that the real velocity of the wind remains yet undetermined.

XI. The force of the wind, like that of other bodies, depends on its velocity and mass; that is, the quantity of air which is in motion: so the same wind has more or less force on any obstacle that opposes it, in proportion as that obstacle presents a greater or a less surface: for which reason it is that they spread the sails of a vessel more or less, and place the wings of a windmill in different directions. The machines by which the winds are measured, are called *anemometers*. They show the direction, the velocity, and the duration of winds. It is by the agitations of the wind that the air is purified; that the seeds of trees and herbs are conveyed through the forests and fields; that ships are driven from one pole to the other; that our mills turn upon their axes, &c.; and art, by imitating nature, sometimes procures us artificial winds, by which we refresh our bodies, invigorate our fires, purify our corn, &c.

XII Water is an universal agent, which nature employs in all her productions. It may be considered as in three states, 1. As a liquid; 2. As a vapour; 3. As ice. These three different states do not in any manner change its essence, but make it proper to answer different ends. The natural state of water would be that of a solid body, as fat, wax, and all those other bodies which are only fluid when heated to a certain degree: for water would be constantly ice, if the particles of fire, by which it is penetrated in the temperate climates, did not render it fluid, by producing a reciprocal motion among its parts; and, in a country where the cold is continually strong enough to maintain the congelation, the assistance of art is necessary to make it fluid in the same manner as we do lead, &c. Water, when not in ice, is a fluid that is insipid, transparent, without colour, and without smell, and that easily adheres to the surface of some bodies, that penetrates many, and extinguishes fire. Experimental philosophy investigates the origin of fountains; the cause of the saltness of the sea; the means of purifying water; what is its weight, and what are its effects when heated, &c. It likewise examines this fluid in the state of vapour; and finds that a drop of water, when in vapour, occupies a space vastly greater than it did before. It explains the *æolipile* and its effects; fire engines; and the force of vapours that give motion to immense machines in mines and elsewhere, &c. and lastly, it considers water in the state of ice. Ice consequently is more cold than water; and its coldness increases if it continue to lose that matter, already too rare; or too little active, to render it fluid. Experimental physics endeavours to investigate the causes of the congelation of water, and why ice is lighter than water; from whence it derives that expansive force by which it breaks the containing vessel; the difference there is between the congelation of rivers and that of standing waters; why ice becomes more cold by the mixture of salts; and many other similar phenomena.

XIII. The nature of fire is yet very much unknown to the most learned philosophers. As objects when at a great distance are not perceptible to our senses, so when we examine them too nearly, we discern them but confusedly. It is still disputed whether fire be a homogene, unalterable matter, designed, by its presence, or by its action, to produce heat, inflammation, and dissolution, in bodies; or if its essence consists in motion only, or in the fermentation of those particles which we call *inflammable*, and which enter as principles, in greater or less quantities, in the composition of mixed bodies. The most learned inquirers into nature incline to the former opinion; and to have recourse to a matter which they regard as the principle of fire. They suppose that there is in nature a fluid adapted to this purpose, created such from the beginning, and that nothing more is necessary than to put it in action. The numberless experiments which are daily made in electricity seem to favour this opinion, and to prove that this matter, this fluid, this elementary fire, is diffused through all nature, and in all bodies, even ice itself. We cannot say to what important knowledge this great discovery of electricity may lead if we continue our inquiries concerning it. It appears, however, that we may believe, without any inconvenience or absurdity, that fire and light, considered in their first principle, are one and the same substance differently modified.

XIV. Be this matter however as it may, experimental philosophy is employed in making the most ingenious and most useful researches concerning the nature of fire, its propagation, and the means by which its power may be excited or augmented; concerning the phosphorus and its inflammation; fire excited by the reflection of the sun's rays from a mirror; and on the effects of fire in general; concerning lightning and its effects; the fusion of metals; gunpowder and its explosion;

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explosion; flame and the aliments of fire; and an infinity of like objects which it explains, or concerning which it makes new discoveries, by the aid of experiments.

XV. By the word *light*, we understand that agent by which nature affects the eye with that lively and almost constantly pleasing sensation, which we call *seeing*, and by which we discern the size, figure, colour, and situation of objects, when at a convenient distance. All philosophers agree, that the light, which is diffused in any place, is a real body. But what this body is, and by what means it enters that place where it is perceived, is a question about which philosophers are divided.

XVI. Experimental philosophy is applied in discovering or proving, by an infinity of experiments, what is the nature of light, in what manner it is propagated, what its velocity and progressive motion. It also investigates and explains the principles of *optics* properly so called, and shows the directions which light observes in its motions. From thence it proceeds to the examen of the principles of catoptrics, and describes the laws and effects of reflected light. It next treats of the principles of dioptrics, and explains the laws of refracted light; and lastly, it teaches, from the principles of natural and artificial vision, the construction of optical instruments, as lenses, concave mirrors, prisms, telescopes, &c. &c. and the uses to which they are applied.

XVII. By resolving or separating the rays of light, philosophy has obtained true and clear discoveries of the nature of colours. We are naturally led to imagine that colours, and their different degrees, make a part of the bodies that present them to our sight; that white is inherent in snow, green in leaves and grass, and red in a stuff dyed of that colour. But this is far from being true. If an object, which presents any colour to our sight, be not illuminated, it presents no colour whatsoever. In the night all is black. Colours therefore depend on light; for without that we could form no idea of them: but they depend also on bodies; for of several objects presented to the same light, some appear white, others red, blue, &c. But all these matters being separate from our own bodies, we should never acquire any ideas of them, if the light, transmitted or reflected by these objects, did not make them sensible to us, by striking upon the organs of our sight, and if these impressions did not revive in us those ideas which we have been used to express by certain terms. For these reasons philosophy considers colours from three points of view, 1. As in the light; 2. In bodies, as being coloured; and, 3. From the relation they have to our visual faculties, which they particularly affect, and by which we are enabled to distinguish them.

It is unnecessary in this place to say more either on colour in particular or experimental philosophy in general. The different subjects of this collective article are particularly treated under their proper names, in the order of the alphabet: the reader will therefore turn, as he has occasion, to ACOUSTICS, CATOPTRICS, CHROMATICS, DIOPTRICS, HYDROSTATICS, MECHANICS, OPTICS, PNEUMATICS, ELECTRICITY, MAGNETISM, *&c. &c. &c.* Also AEROLOGY, AEROSTATION, ATMOSPHERE, *BURNING-Glass*, COLD, COLOUR, CONGELATION, EVAPORATION, FIRE, FLAME, FLUIDITY, HEAT, IGNITION, LIGHT, SOUND, STEAM, WATER, WIND, &c.

Experimentum Crucis. Expiation.

EXPERIMENTUM CRUCIS, a capital, leading, or decisive experiment; thus termed, either on account of its being like a cross, or direction-post placed in the meeting of several roads, guiding men to the true knowledge of the nature of that thing they are inquiring after; or, on account of its being a kind of torture, whereby the nature of the thing is as it were extorted by force.

EXPHORESIS. See ORATORY, nº 85.

EXPIATION, a religious act, by which satisfaction or atonement is made for the commission of some crime, the guilt done away, and the obligation to punishment cancelled.

Expiations among the Heathens, were of several kinds; as sacrifices and religious washings. They were used for effacing a crime, averting any calamity, and on numberless other occasions, as purifying towns, temples, and sacred places, and armies before and after battle. And they were performed for whole cities as well as particular persons.

The method of expiation among the Jews was chiefly by sacrifice, whether for sins of ignorance, or to purify themselves from certain pollutions.

Feast of EXPIATION among the Jews, called by our translators the *day of atonement*, was held on the tenth day of Tisri, or the seventh month of the Jewish year, answering to part of our September and October. It was instituted by God himself, Levit. xxiii. 27, &c. On that day the high-priest, the figure or type of Jesus Christ, entered into the most holy place, and confessed his sins; and, after several ceremonies, made an atonement for all the people to wash them from their sins. Lev. chap. xvi. See *SCAPE-Goat*. Expiation Explosion.

EXPIATION, in a figurative sense, is applied by divines to the pardon procured to the sins of the penitent by the merit of Christ's death. See the article CHRISTIANITY.

EXPIRATION, in medicine. See EXSPIRATION.

EXPIRATION, is also used figuratively, for the end of a term of time granted, agreed on, or adjudged.

EXPLICIT, in the schools, something clear, distinct, formal, and unfolded.

EXPLOSION, in natural philosophy, a sudden and violent expansion of an aerial or other elastic fluid, by which it instantly throws off any obstacle that happens to be in the way, sometimes with incredible force, and in such a manner as to produce the most astonishing effects upon the neighbouring objects.

Difference between explosion and expansion.

Explosion differs from expansion, in that the latter is a gradual and continued power, acting uniformly for some time; whereas the former is always sudden, and only of momentary duration. The expansions of solid substances do not terminate in violent explosions, on account of their slowness, and the small space through which

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Explosion.

which the metal, or other expanding substance, moves; though their strength may be equally great with that of the most active aerial fluids. Thus we find, that though wedges of wood, when wetted, will cleave solid blocks of stone, they never throw them to any distance, as is the case with gun-powder. On the other hand, it is seldom that the expansion of any elastic fluid bursts a solid substance without throwing the fragments of it to a considerable distance, the effects of which are often very terrible. The reasons of this may be comprised in the two following particulars: 1. The immense velocity with which the aerial fluids expand, when affected by a considerable degree of heat; and, 2. Their celerity in acquiring heat and being affected by it, which is much superior to that of solid substances. Thus air, heated as much as iron when brought to a white heat, is expanded to four times its bulk; but the metal itself will not be expanded the 500th part of the space. In the case of gun-powder, which is a violent and well-known explosive substance, the velocity with which the flame moves is calculated by Mr Robins, in his Treatise upon Gunnery, to be no less than 7000 feet in a second, or little less than 79 miles per minute. Hence the impulse of the fluid is inconceivably great, and the obstacles on which it strikes are hurried off with vast velocity, though much less than that just mentioned; for a cannon bullet, with the greatest charge of powder that can be conveniently given, does not move at a greater rate than 2400 feet per second, or little more than 27 miles per minute. The velocity of the bullet again is promoted by the sudden propagation of the heat through the whole body of air as soon as it is extricated from the materials of which the gunpowder is made; so that it is enabled to strike all at once, and thus greatly to augment the momentum of the ball. It is evident that this contributes very much to the force of the explosion by what happens when powder is wetted or mixed with any substance, which prevents it from taking fire all at once. In this case the force of the explosion, even when the same quantity of powder is made use of, cannot be compared to that of dry powder.

2 General causes of explosions.

Upon these principles we may conclude, that the force of an explosion depends, 1. On the quantity of elastic fluid to be expanded; 2. On the velocity it acquires by a certain degree of heat; and, 3. On the celerity with which the degree of heat affects the whole of the expansile fluid. These three take place in the greatest perfection where the electric fluid is concerned; as in cases of lightning, earthquakes, and volcanoes. This fluid, as is shown in many parts of this work, differs not from elementary fire or the light of the sun; it pervades the whole system of nature; its expansion is nothing else than its motion from a centre towards a circumference, for it does not seem capable of any proper expansion by a separation of its parts like any other fluid. Hence, when it begins to expand in this manner, the motion is propagated through it with a velocity far exceeding that of any other fluid whatever. Thus, even when the quantity is excessively small, as when an electric spark is sent through a glass full of water or of oil, the expansion is so violent as to dissipate the glass into innumerable fragments with great danger to the by-standers, as is observed under the article ELECTRICITY. In violent lightning, where the electric fluid collects itself into balls, the strength of the explosion is proportionable to the quantity. Every one has heard of the prodigious effects of lightning when it happens to strike buildings, trees, or even the most solid rocks; and in some cases, where the quantity of electricity is still greater than in any flash of lightning, we hear of still more tremendous consequences ensuing. Dr Priestley gives an instance of a large fire-ball (undoubtedly a quantity of electric matter) rolling on the surface of the sea, which after rising up to the top-mast of a ship of war, burst with such violence that the explosion resembled the discharge of hundreds of cannon fired at once. Great damage was done by it; but there is not the least doubt that most of its force was spent on the air, or carried down to the sea by the mast and iron-work of the ship. Indeed, considering that in all cases a great part of the force of electric explosions is dissipated in this manner, it may justly be doubted whether they can be measured by any method applicable to the mensuration of other forces. Even in artificial electricity the force is prodigiously great; insomuch that Dr Van Marum calculated that of the great battery belonging to the machine in Teyler's museum to be upwards of 900 pounds.

3 Electric explosions the strongest of all.

4 Volcanic explosions next in strength.

In those cases where the electrical matter acts like common fire, the force of the explosions, though exceedingly great, is capable of mensuration by comparing the distances to which the bodies are thrown with their weight. This is most evident in volcanoes, where the projections of the burning rocks and lava manifest the greatness of the power, at the same time that they afford a method of measuring it. These explosions, as is shown under the article VOLCANO, are owing to extrication of aerial vapours, and their rarefaction by intense heat. In all of them the air is originally in a state of decomposition, viz. its invisible and solid part is joined with some terrestrial substance. Thus, when fixed air, for instance, is exposed to any pure earth which attracts it, as calcined magnesia, a decomposition instantly takes place. All these vapours * are composed of elementary fire and some invisible substance capable of assuming a solid form. The decomposition just mentioned is therefore easily explained; the solid part of the air joins itself to the magnesia, while the elementary fire or latent heat is dissipated, and passes thro' the sides of the vessel. Were it now in our power suddenly to restore the latent heat to the whole of the fixed air, so that it would at once assume its former expansion, a violent explosion would follow. This seems to be precisely the case with the volcanic explosions. An immense quantity of the fixed part of different aerial fluids is united to the various substances found below the surface of the earth. By means of the electric fire which kindles the volcanoes, the aerial fluids are suddenly restored to their elastic state; and not only so, but their natural elasticity is greatly augmented, so that the explosions take place with great violence. The case is the same with gunpowder; only that the condensed air in this case is at first of the dephlogisticated kind, but is quickly phlogisticated by reason of the combustible matters mixed with the nitre, while the heat produced by the inflammation augments the elasticity of the generated air to four times what it usually is, so that the whole force of the explosion is calculated at 1000

5 In what manner aerial explosions take place.

* See *Elastic Vapours*.

6 Explosion of gunpowder explained.

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Explosion.

times the pressure of the common atmosphere *. Thus the explosions of gunpowder and of volcanoes are essentially the same. The reason of the extreme quickness of those of gunpowder is, that it takes fire so readily by the intimate mixture and combustibility of all the materials. In volcanoes the explosions likewise follow one another very quickly, and are by no means inferior in strength to those of gunpowder: but here the quantity of vapour makes up for the comparative slowness with which it is affected by the heat. Thus, though we could not by any means contrive to fire cannon in quick succession by means of calcareous earth as we can do with gunpowder, yet in the huge furnace of a volcano the elastic matter is supplied in such quantities, that the explosions are in a manner unremitting; and even in ordinary experiments the confinement of aerial vapours has often occasioned violent explosions in chemical vessels. In one case too the extrication of fixed air adds excessively to the force of an explosion, *viz.* in that of pulvis fulminans. This is compounded of sulphur, saltpetre, and salt of tartar. The latter we know contains much fixed air: and it is probable that the violence of the explosion is occasioned by this air; for the greater quantity of it that the alkaline salt contains, the greater force does it explode with. Fulminating gold emits a quantity of phlogisticated air, to which its explosive power is supposed to be owing, as is explained under the article CHEMISTRY; but that of fulminating silver is so extraordinary, that scarce any force of aerial vapour that can be extricated is likely to produce it, and it seems probable that electricity itself is concerned.

* See the article *Gunnery*.

7 Of pulvis fulminans, &c.

8 Explosions by aqueous vapours

Next in strength to the aerial vapours are those of aqueous and other liquids. The most remarkable effects of these are observed in steam-engines; but there is one particular case from which it has been inferred that aqueous steam is vastly stronger than the flame of gunpowder. This is when water is thrown upon melted copper: for here the explosion is so strong as almost to exceed imagination; and the most terrible accidents have been known to happen from such a slight cause as one of the workmen spitting in the furnace where copper was melting. Here, however, it is most probable that a decomposition of the water takes place. That this element can be decomposed or resolved into an aerial and a solid substance, is extremely probable from the experiments of Dr Priestley, as well as those of the French philosophers. The position is indeed denied by the phlogistians; but their arguments appear not to be conclusive; nor is it a fact which militates in the least against their principles. On the supposition that the water is decomposed in the present case, however, the phenomenon in question is easily solved. The water being thrown in substance upon the melted copper, is decomposed by the violent heat; and one part of it adheres to the metal, thus converting it into a kind of calx, while the other is converted into inflammable or some other kind of air, which expanding suddenly, throws the melted metal all about with the greatest violence by means of its re-action.

9 Violent explosion of water with melted copper.

10 Probably owing to a decomposition of the water.

11 Particularly explained.

To understand the manner in which this is accomplished, we must consider some of the principles of GUNNERY laid down by Mr Robins, and related under that article. One of these is, that though the air, in cases of ordinary velocity, makes no great resistance, it is far otherwise where the velocity of the moving body becomes very great. In all cases of explosion also there is in the first instance a vacuum made by the exploding fluid; and consequently the weight of the atmosphere is to be overcome, which amounts to about 15 pounds on every square inch of surface. Supposing the surface of the exploding fluid, then, on that of melted copper to contain an area of 4 square inches, it meets with a resistance of 60 pounds from the atmosphere, and consequently communicates an equal pressure to the fluid metal. Even this must of consequence throw it about, unless the same pressure was exactly diffused over every part of the surface: But much more must this effect be increased by the immense velocity with which the fluid moves, and by which the resistance of the atmosphere is augmented in a prodigious degree, as is explained under the article GUNNERY. The elastic fluid generated is then confined not only by the fluid metal and sides of the furnace, but by the air itself, which cannot get out of the way; so that the whole resembles a cannon closed at the mouth, and filled with inflamed gunpowder. Hence not only the melted metal, but the furnace itself and the adjacent walls of the building, are hurried off as they would be by the firing of a great quantity of gunpowder in a small space, and which is well known to produce analogous effects. Explosion.

12 Is not owing to more aqueous steam intensely heated.

In explaining the phenomenon in question, Dr Black supposes that the mere heat of the metal applied to the aqueous steam produces the explosion; and in proof of this alleges, that copper imbibes a greater quantity of heat during fusion than any other metal. Aqueous steam, however, seems to be too slow for producing such sudden and violent effects. Explosions, it is true, will be occasioned by it, but then it must be confined for a very considerable time; whereas the effects of water thrown upon melted copper are instantaneous.

13 Why such explosions do not take place with other metals.

It may now be asked, Why such explosions do not take place with any other metal, iron for instance, when water is thrown upon its surface in fusion? In answer to this we must observe, That though water is decomposed by being applied to red-hot iron in the form of steam, yet there is a possibility, that when the same element is applied in substance to the fluid metal, no decomposition may ensue. Something like this indeed happens with copper itself; for, notwithstanding the violent effects which take place on the contact of water in substance with the melted metal, no explosion happens though aqueous steam be blown upon its surface. On the contrary, the upper part of the metal is thus cooled, and forms itself into cakes, which are afterwards taken off, and new ones formed in the same manner; neither does aqueous steam affect red-hot copper in the manner that it does iron in the same state. A decisive proof that the explosion is not occasioned by the mere heat of the aqueous steam may be deduced from the example of melted glass, which produces no explosion though we pour water upon it in that state; and yet the heat of melted glass is undoubtedly equal at least to that of melted copper. It must be observed, however, that in all cases where a very hot body is thrown upon a small quantity of water in substance, an explosion will follow; but here the water is confined and suddenly rarefied into steam, which cannot get away without throwing off the body which confines

14 Explosions when heated substances are thrown upon small quantities of water.

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Explosion. confines it. Examples of this kind frequently occur where masons or other mechanics are employed in fastening cramps of iron into stones; where, if there happens to be a little water in the hole into which the lead is poured, the latter will fly out in such a manner as sometimes to burn them severely. Terrible accidents of this kind have sometimes happened in founderies, when large quantities of melted metal have been poured into wet moulds. In these cases, the sudden expansion of the aqueous steam has thrown out the metal with violence; and if any decomposition has taken place at the same time, so as to convert the aqueous into an aerial vapour, the explosion must be still greater.

15 By pouring cold water into boiling oil. To this last kind of explosion we must refer that which takes place on pouring cold water into boiling or burning oil or tallow. Here the case is much the same whether we pour the oil on the water, or the water on the oil. In the former case, the water which lies at the bottom is rarefied into steam and explodes; in the latter, it sinks down through the oil by its superior specific gravity, and explodes as it passes along. In either case, however, the quantity of aqueous fluid must be but small in proportion to that of the oil: a very great quantity would put out the flame, or destroy the heat, in whatever way we applied it.

16 Explosions in solid substances explained. Another kind of explosion is that which takes place in solid substances, where we can scarce suppose either aqueous or aerial vapours to be concerned. The most remarkable of these are the *volcanic bombs* mentioned by Sir William Hamilton in the great eruption of Vesuvius in 1779. They were large pieces of lava which burst in pieces like bombs as they fell to the ground; but he does not inform us whether their bursting was attended with any great violence or not. Indeed, amidst such scenes of horror, and the continual tremendous explosions of the volcano, smaller phenomena of this kind would probably be overlooked. Other examples are the *Glass-Tears*, of which an account is given under that article; the bursting of electrical globes, when put in motion; of other glass-vessels spontaneously, and seemingly without any cause; and lastly, the bursting of large cast-metal vessels in the act of cooling. These are all so similar to one another, that it is probable they depend on one general cause. All of them agree in this respect, that the extreme parts of them are considerably cooled, while the internal remain very hot. Thus, in the volcanic bombs, the current of air, formed by their swift passage through it in falling, necessarily carries off a great quantity of heat from the parts which are in contact with it, while the rest are scarce at all cooled. The glass-tears are artificially cooled on the outside by dropping them upon water; and in consequence of this, their explosion is probably more violent in proportion to their bulk than that of the volcanic bombs. Glass-vessels only burst spontaneously when they have not been well annealed; and we know that this bad annealing consists only in applying cold too suddenly to the outside. Something like this probably takes place when cast-iron vessels explode; and we are certain it does so with electrical globes, for these last are not apt to burst if they have been well annealed. In all cases, therefore, there is a remarkable contraction of the outward surface by the cold, while the internal parts remain as much expanded as ever. In this case there must be a continual effort of that subtile fluid called *elementary fire*, from the internal to the external part, as the contraction gradually proceeds the contrary way. Thus, when a volcanic bomb, for instance, is cooled on the outside, its parts are consolidated so that the internal fluid has not such an easy passage through it as is necessary. In consequence of this it makes a greater effort, which is still farther augmented by the cooling and contraction of the internal parts squeezing the fluid out from among themselves, and forcing it to recoil upon that in the centre, as well as to exert itself against the external part; from which united operation the effect already mentioned at last takes place. This explanation, however, does not hold with respect to electrical globes, glass-tears, or ill-annealed glass: but in order to accommodate it to all these, we have only to remember, that *fire*, and the electric fluid acting from a centre to a circumference, are not in the least different; so that from whatever cause the electric matter is disposed to act in this manner, the same effect will follow, *i. e.* an explosion will take place if the substance does not afford an equally ready passage through all its parts, and that whether any sensible heat is felt in it or not. Explosion.

17 Explosion of inflammable and dephlogisticated air. The only other kind of explosion we have to take notice of is that produced by inflammable and dephlogisticated air, when mixed together and set on fire. This differs from any of those hitherto considered, because in reality there is an absolute condensation rather than an expansion throughout the whole of the operation; and could the airs be made to take fire throughout their whole substance absolutely at the same instant, there would be no explosion, but only a sudden production of heat. From this cause also is derived a very singular phenomenon taken notice of by Dr Priestley in his late experiments on that subject, recorded in the Phil. Trans. Having inclosed several quantities of inflammable and dephlogisticated air in a copper vessel, firing them afterwards by the electric sparks, he found that the force of the explosion was directed more towards one part of the vessel than another; least on that part where the electrical discharge was made, and most upon that which was farthest from it. This inequality was very considerable; insomuch that he could not repeat his experiments any number of times without injuring the vessel in that part which was farthest from the discharge. The reason he gives for this is, that the mixture was not fired at the same instant, but first at the place where the discharge was made. This first explosion would have acted equally upon all parts of the vessel, had it not been for the intervention of the air. By the first momentary explosion, however, the air in the farthest part of the vessel was condensed, so that the next explosion was made stronger, while the copper in the fore-part of the vessel had the whole of this strong explosion to resist, the hinder part being but little concerned, as the air in it was condensed and reduced almost to a vacuum.

18 Singular phenomenon observed by Dr Priestley.

19 Uses to which explosions are applied. Though the phenomena of explosions are sometimes very destructive, they are likewise of considerable use in life, by removing obstacles which could scarcely be got the better of by any mechanical power whatever. The principal of these are the blowing up of rocks, the separating of stones in quarries, and other purposes of that.

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Explosion. that kind. The destruction occasioned by them in times of war, and the machines formed upon the principle of explosion for the destruction of the human race, are well known; and if we cannot call these *useful*, we must allow them at least to be necessary evils. For the

20 Attempts to supersede the use of gunpowder. production of explosions, gunpowder is the only substance that has yet been found to answer; nevertheless, as its use is attended with considerable expence, several attempts have been made to find out a cheap substitute for it. One of the most remarkable of these was by mixing small quantities of water inclosed in little bladders or some easily destructible vehicles along with a charge of powder. By this contrivance it was hoped, that the water being converted into vapour when the powder was inflamed, would augment the force of the explosion: but instead of this, it was found greatly to diminish it. The reason was evident, viz. that the conversion of the water into steam required so much of the latent heat of the inflamed gunpowder, that enough was not left to give the necessary expansion to the aerial fluid produced. A mixture of inflammable and dephlogisticated air has also been tried; but the explosion here has always been found too weak. In mines, indeed, very terrible effects are produced by such a mixture, but in these the quantity is immense; so that the comparative weakness of the mixture cannot be discovered. Electricity therefore seems to be the only resource we have; except by adding ingredients to gunpowder which may increase the strength of it. There can be no doubt indeed that the electric fluid is possessed of sufficient strength to perform every thing we could desire; and electricians have supposed, perhaps justly enough, that a cannon charged with water might, by means of electricity, become more dangerous than one charged with gunpowder: but this fluid is so exceedingly capricious, so imperceptible and unmanageable, that the use of it cannot as yet be thought practicable, nor in all probability ever will be so.

21 Effects of explosions on the atmosphere and electric fluid. The effects of explosions, when violent, are felt at a considerable distance, by reason of the concussions they give to the atmosphere; for, as has been already hinted, all of them act upon the atmospherical fluid with the very same force they exert upon terrestrial substances subjected to their action. Sir William Hamilton relates, that at the explosions of Vesuvius in 1767, the doors and windows of the houses at Naples flew open if unbolted, and one door was burst open though it had been locked. A great quantity of gunpowder being put into the ditch of a fortified city, and set on fire, destroyed part of the wall, and broke down one of the gates. The blowing up of powder-magazines or powder-mills will destroy buildings and kill people, though certainly without the reach of the flame, and untouched by any part of the shattered magazine or mill. But the most curious effect is, that they electrify the air and even glass-windows at a considerable distance. This is always observable in firing the guns of the Tower at London: and some years ago, after an explosion of some powder-mills in the neighbourhood of that city, a great number of people were alarmed by a ratttling and breaking of their china-ware; which by the vulgar was taken for a supernatural phenomenon, but undoubtedly was owing to some commotion in the electrical fluid from the violent concussion of the atmosphere. In this respect, however, the effects of electrical explosions themselves are most remarkable, though not in the uncommon way just mentioned; but it is certain, that the influence of a flash of lightning is diffused for a great way round the place where the explosion happens, producing many very perceptible changes both on the animal and vegetable creation.

Exponent || Exposing.

EXPONENT, in algebra, the same with index. See ALGEBRA.

EXPONENT is also used in arithmetic, in the same sense as index or logarithm.

EXPORTATION, the shipping and carrying out of the kingdom wares and commodities for other countries. See the articles COMMERCE, TRADE, and SHIPPING.

EXPOSING, the act of setting a thing to public view. In the Romish church, the sacrament is said to be *exposed* when it is shown in public uncovered on festival days, and during the time of plenary indulgences.

EXPOSING is also used with a farther latitude: thus we say, It is prohibited to expose false and clipped money. Such a house stands very high, and has a delicious prospect; but it is exposed to all the four winds. Such a city being on the frontiers, and not fortified, is exposed to the insults of every party of forces.

EXPOSING of Children, a barbarous custom practised by most of the ancients excepting the Thebans, who had an express law to the contrary, whereby it was made capital to expose children; ordaining at the same time, that such as were not in a condition to educate them should bring them to the magistrates, in order to be brought up at the public expence. Among the other Greeks, when a child was born, it was laid on the ground; and if the father designed to educate his child, he immediately took it up; but if he forbore to do this, the child was carried away and exposed. The Lacedemonians indeed had a different custom: for with them all new-born children were brought before certain triers, who were some of the gravest men in their own tribe, by whom the infants were carefully viewed; and if they were found lusty and well-favoured, they gave orders for their education, and allotted a certain proportion of land for their maintenance; but if weakly or deformed, they ordered them to be cast into a deep cavern in the earth, near the mountain Taygetus, as thinking it neither for the good of the children themselves nor for the public interest, that defective children should be brought up. Many persons exposed their children only because they were not in a condition to educate them, having no intention that they should perish. It was the unhappy fate of daughters especially to be thus treated, as requiring more charges to educate and settle them in the world than sons.

The parents frequently tied jewels and rings to the children they exposed, or any other thing whereby they might afterwards discover them, if Providence took care for their safety. Another design in adorning these infants was either to encourage such as found them to nourish and educate them, if alive; or to give them human burial if dead. The places where it was usual to expose children were such as people frequented most. This was done in order that they might be found, and taken up by compassionate persons who were in circumstances to be at the expence of their education. With this intention the Egyptians and

6 Romans

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Expoſition || Extant.

Romans choſe the banks of rivers, and the Greeks the highways.

EXPOSITION, in general, denotes the ſetting a thing open to public view. See EXPOSING.

EXPOSITION, in a literary ſenſe, the explaining an author, paſſage, writing, or the like, and ſetting their meaning in an obvious and clear light.

EXPOSITOR, or EXPOSITORY, a title which ſome writers have given to a leſſer kind of dictionaries or vocabularies, ſerving to expound or explain the meaning of the obſcure or difficult words of a language. It is alſo uſed in the ſame ſenſe with commentary and paraphraſe.

EXPOSTULATION, in rhetoric, a warm addreſs to a perſon who has done another ſome injury, repreſenting the wrong in the ſtrongeſt terms, and demanding redreſs.

EXPOSURE, in gardening, the ſituation of a garden wall, or the like, with reſpect to the points of the compaſs, as ſouth or eaſt. See GARDENING.

Ex-poſt-facto, in law, denotes ſomething done after another thing that was committed before. An eſtate granted may be made good by matter *ex-poſt-facto*, that was not ſo at firſt by election, &c.

EXPRESSED OILS, in chemiſtry, ſuch oils as are obtained from bodies only by preſſing. See OIL.

EXPRESSION, in rhetoric, the elocution, diction, or choice of words in a diſcourſe. See LANGUAGE, ORATORY, and POETRY.

EXPRESSION, in muſic. See COMPOSITION.

EXPRESSION, in painting, a natural and lively repreſentation of the ſubject, or of the ſeveral objects intended to be ſhown.

The expreſſion conſiſts chiefly in repreſenting the human body and all its parts, in the action ſuitable to it: in exhibiting in the face the ſeveral paſſions proper to the figures, and obſerving the motions they impreſs on the external parts. See PAINTING.

EXPRESSION Theatrical. See DECLAMATION, article iv.

EXPRESSION, in medicine, chemiſtry, &c. the act of expreſſing or extracting the juices or oils of plants, fruits, or other matters, by ſqueezing, wringing, or preſſing them in a preſs. After having let the herbs infuſe a due time, their juice muſt be drawn by expreſſion in a linen cloth or by a preſs.

EXPULSION, in a general ſenſe, the act of violently driving a perſon out of any city, ſociety, &c.

EXPULSION, in medicine, the act whereby any thing is forcibly driven out of the place in which it is: thus we ſay, the expulſion of the fetus in delivery.

EXSICCATION, (formed of *ex* and *ſiccus*, "dry,") in chemiſtry, &c. the act of drying up or evaporating the moiſture of a thing.

EXSPIRATION, in phyſic, that part of reſpiration by which the air is expelled or driven out of the lungs. See ANATOMY, n° 118. and RESPIRATION.

EXSUDATION, or EXUDATION the act of ſweating out. In which manner, gums, balſams, &c. are uſually produced from trees.

EXTANT, ſomething that ſtill ſubſiſts, or is in being. It is but part of the hiſtory of Livy, of the writings of Cicero, Cæſar, &c. that are extant, the reſt are loſt. We have nothing extant of Socrates, though he wrote a great deal.

Extaſy || Extortion.

EXTASY, a tranſport which ſuſpends the function of the ſenſes, by the intenſe contemplation of ſome extraordinary or ſupernatural object.

EXTASY, in medicine, a ſpecies of catelepſy, when a perſon perfectly remembers, after the paroxyſm is over, the ideas he conceived during the time it laſted.

EXTENSION, in philoſophy, one of the common and eſſential properties of body; or that by which it poſſeſſes or takes up ſome part of univerſal ſpace, which is called the place of that body. See METAPHYSICS, n° 56.

EXTENSOR, an appellation given to ſeveral muſcles, from their extending or ſtretching the parts to which they belong. See ANATOMY, *Table of the Muſcles*.

EXTENT, in law, is uſed in a double ſenſe. Sometimes it ſignifies a writ or command to the ſheriff for the valuing of lands or tenements; and ſometimes the act of the ſheriff, or other commiſſioner, upon this writ.

Old and New EXTENT, in Scots law. See LAW, N° clxvi. 6.

EXTENUATION, the act of diminiſhing or leſſening the bulk or ſubſtance of a thing, eſpecially of the human body. Fevers, agues, long abſtinences, &c. occaſion great extenuations or emaciations.

EXTENUATION, is alſo a figure in rhetoric, oppoſite to the hyperbole. The Greeks call it λιτότης.

EXTERIOR, or EXTERNAL. See EXTERNAL.

EXTERMINATION, in general, the extirpating or deſtroying ſomething.

EXTERMINATION, or EXTERMINATING, in algebra, is uſed for taking away. Thus algebraiſts ſpeak of extirminating ſurds, fractions, and unknown quantities out of equations. See Maclaur. Algebr. part i. chap. 12. where we have ſome general theorems for the exterminating unknown quantities in given equations.

EXTERNAL, a term of relation applied to the ſurface or outſide of a body, or that part which appears or preſents itſelf to the eye, touch, &c. in contradiſtinction to internal.

EXTERNAL is alſo uſed to ſignify any thing that is without ſide a man, or that is not within himſelf, particularly in his mind; in which ſenſe we ſay, external objects, &c.

EXTINCTION, in general, denotes the putting out or deſtroying ſomething, as a fire or flame. See *Extinguiſhing of FIRE*.

EXTINGUISHMENT, in law, is a conſolidation or union, as where one has due to him a yearly rent out of lands, and afterwards purchaſes the lands out of which the rent ariſes; in this caſe, both the property and the rent being united in one poſſeſſor, the rent is ſaid to be extinguiſhed.

EXTIRPATION, (formed of *ex* and *ſtirps*, "root") the act of pulling up or deſtroying a thing to the very roots. Among the prayers of the Romiſh jubilee, there is one for the extirpation of hereſy.

EXTIRPATION is alſo uſed, in ſurgery, for cutting off any part entirely; as a wen, &c. or the eating it away, as a wart, &c. by corroſive medicines.

EXTISPEX, in antiquity, the perſon who drew preſages from viewing the intrails of animals offered in ſacrifice.

EXTORTION, in law, is an illegal manner of wreſting any thing from a man, either by force, menace,

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Extract || Extravagantes.

nace, or authority. It is alſo the exaction of unlawful uſury, winning by unlawful games, and taking more than is due under pretence of right, as exceſſive tolls in millers, &c.

At the common law, extortion is puniſhable by fine and impriſonment; and the ſtatute of 3 Eliz. 1. c. 30. has enacted, that officers of juſtice guilty of extortion for the expedition of buſineſs, &c. ſhall render to the party treble value. There are likewiſe divers other ſtatutes for puniſhing extortions of ſheriffs, bailiffs, goalers, clerks of the aſſize and of the peace, attornies, ſolicitors, &c.

EXTRACT, in pharmacy, is a ſolution of the purer parts of a mixed body inſpiſſated, by diſtillation or evaporation, nearly to the conſiſtence of honey.

EXTRACT, in matters of literature, is ſomething copied or collected from a book or paper.

EXTRACTION, in chemiſtry and pharmacy, the operation by which eſſences, tinctures, &c. are drawn from natural bodies. See EXTRACT.

EXTRACTION, in ſurgery, is the drawing any foreign matter out of the body by the hand, or by the help of inſtruments. See SURGERY.

EXTRACTION, in genealogy, implies the ſtock or family from which a perſon is deſcended. See DESCENT.

EXTRACTION of Roots, in algebra and arithmetic, the methods of finding the roots of given numbers or quantities. See ALGEBRA, and ARITHMETIC.

EXTRACTOR, in midwifery, an inſtrument or forceps for extracting children by the head.

EXTRAJUDICIAL, ſomething done out of the proper court, or the ordinary courſe of law. As when judgment is given in a cauſe, or caſe, not depending in that court where ſuch judgment is given, or wherein the judge has no juriſdiction.

EXTRAORDINARII, amongſt the Romans, was a body of men conſiſting of a third part of the foreign horſe and a fifth of the foot, which was ſeparated from the reſt of the forces borrowed from the confederate ſtates with great policy and caution, to prevent any deſign that they might poſſibly entertain againſt the natural forces. A more choice body of men were drawn from among the extraordinarii under the name of *ablecti*. See ABLECTI.

EXTRAORDINARY, ſomething out of the common courſe.

EXTRAORDINARY Couriers, are thoſe ſent expreſs on ſome urgent occaſion.

EXTRAORDINARY Ambaſſador, or envoy, is ſuch a one as is ſent to treat or negociate ſome ſpecial and important affair, as a marriage, a treaty, confederacy, &c. or even on occaſion of ſome ceremony, as condolence, congratulation, &c.

A gazette, journal, or other news-paper extraordinary, is that publiſhed after ſome great and notable event, containing the detail or particulars thereof, which are not found in the ordinary papers.

EXTRAVAGANTES, thoſe decretal epiſtles which were publiſhed after the CLEMENTINES.

They were ſo called, becauſe at firſt they were not digeſted or ranged with the other papal conſtitutions, but ſeemed to be, as it were, detached from the canon law. They continued to be called by the ſame name when they were afterwards inſerted in the body of the canon law. The firſt extravagantes are thoſe of John XXII. ſucceſſor of Clement V. The laſt collection was brought down to the year 1483, and was called the *common extravagantes*, notwithſtanding that they were likewiſe incorporated with the reſt of the canon law.

Extravaſation || Exudation.

EXTRAVASATION, in contuſions, fiſſures, depreſſions, fractures, and other accidents of the cranium, is when one or more of the blood-veſſels, that are diſtributed in the dura mater, is broke or divided, whereby there is ſuch a diſcharge of blood as greatly oppreſſes the brain, and diſturbs its office; frequently bringing on violent pains and other miſchiefs; and at length death itſelf, unleſs the patient is timely relieved. See SURGERY and MEDICINE.

EXTREME, is applied to the laſt and outermoſt part of any thing; or that which finiſhes and terminates it on that ſide.

EXTREMES, in logic, denote the two extreme terms of the concluſion of a ſyllogiſm; viz. the predicate and ſubject. They are called *extremes*, from their relation to another term, which is a medium or mean between them. The predicate, as being likewiſe had in the firſt propoſition, is called the *majus extremum*, greater extreme; and the ſubject, as being put in the ſecond or minor propoſition, is called the *minus extremum*, leſſer extreme. Thus, in the ſyllogiſm, man is an animal; Peter is a man, therefore Peter is an animal; the word animal is the greater extreme, Peter the leſs extreme, and the man the medium. See SYLLOGISM.

EXTREME and mean proportion, in geometry, is when a line is ſo divided, that the whole line is to the greater ſegment, as that ſegment is to the other: Or, as Euclid expreſſeth it, when the line is ſo divided, that the rectangle under the whole line, and the leſſer ſegment, is equal to the ſquare of the greater ſegment.

EXTREME Unction. See UNCTION.

EXTREMITIES of figures, in painting, is uſed for the head, hands, and feet. Theſe ſhould be drawn with more nicety and exactneſs, or more terminated than other parts; and thus help to render the action more expreſſive.

EXTRINSIC among metaphyſicians, is taken in various ſenſes. Sometimes it ſignifies a thing's not belonging to the eſſence of another; in which ſenſe, the efficient cauſe and end of a thing are ſaid to be extrinſic. Sometimes it ſignifies a thing's not being contained within the capacity of another; in which ſenſe, thoſe cauſes are called extrinſic which introduce ſomething into a ſubject from without, as when a fire introduces heat. Sometimes it ſignifies a thing added or applied to another; in which ſenſe accidents and adherents are ſaid to be extrinſic to the ſubjects to which they adhere. Sometimes the viſion is ſaid to be extrinſic from ſome form which does not exiſt in that thing, but is adjacent to it, or by ſome means or other without it.

EXTUBERANCES, in medicine, are ſwellings or riſings up in the fleſh or other parts of the body.

EXUBERANCE, (compounded of *ex* and *uber* "plentiful;") in rhetoric, a redundancy. See REDUNDANCE and PLEONASM.

EXUDATION. See EXSUDATION.

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Exverræ || Eye.

EXVERRÆ, in antiquity, a kind of brush used in cleansing houses out of which a dead person had been carried.

EXULCERATION, in medicine, the act of causing or producing ulcers. Thus, arsenic exulcerates the intestines; corrosive humours exulcerate the skin.

EXULCERATION is sometimes also used for an ulcer itself; but more generally for those beginning erosions which wear away the substance, and form ulcers.

EXUVIÆ, among naturalists, denote the cast-off parts or coverings of animals, as the skins of serpents, caterpillars, and other insects.

EXUVIÆ is also used for some shells and other marine bodies, frequently found in the bowels of the earth; supposed to have been deposited there at the deluge, as being the real spoils of once living creatures. See SHELL, FOSSILE, and DELUGE.

EY, in our old writers, the same with *insula* "an island;" from which comes *eyet*, a small island or islet, vulgarly called *eyght*.

EYCK. See BRUGES (John of.)

EYE, in anatomy. See ANATOMY, nº 142.

A new-born child shall be observed, perhaps, never to keep its eyes fixed on any one object, but continually changing from one to another, and if you put your hand before them, the child will not wink. Hence some have thought, that new-born infants have no sight: but this is a mistake; and the true reason why their eyes are in perpetual motion is, that they have not yet acquired the habit of examining one thing at once with their eyes: their not winking at the approach of the hand, arises from their want of experience how easily their eyes may be hurt; but in a few days they get the habit of winking, so that afterwards their eyes do it spontaneously at the approach of danger.

Artificial eyes are made of concave plates of gold, silver, or glass, and are stained so as to resemble the natural eye. They must, when fixed in the orbit, be taken out and cleaned every night, and replaced in the morning. If no more of a diseased eye is removed than what is preternaturally projected, or if enough is left to preserve the muscles unhurt, the artificial eye will have a little motion from the muscles that remain. If the eye does not sit well, it irritates and inflames the other eye; in which case lay it aside, until one can be had that fits better.

Bull's Eye, in astronomy. See ALDEBARAN.

Eye of a Block, in naval affairs, that part of the rope-strop which is fastened to some necessary place in the ship: the strop is a sort of wreath or rope formed into a ring, and fixed round the block for the double convenience of strengthening the block and fastening it in any place where it is wanted.

EYE, in agriculture and gardening, signifies a little bud or shoot, inserted into a tree by way of graft. See ENGRAFTING.

Eye of a Tree, a small pointed knot to which the leaves stick, and from which the shoots or sprigs proceed. See GEMMA.

EYE, a town of Suffolk, 22 miles from Ipswich and 91 from London. It may be called an island, because it is surrounded by a brook near the borders of Norfolk, in the road between Ipswich and Norwich. It was incorporated by king John; has two bailiffs, 10 principal burgesses, 24 common council, a recorder, and town-clerk. It is a mean-built place, with narrow streets. The chief manufacture is bone-lace and spinning. Here is, however, a large handsome church; and near it are the ruinous walls of an ancient castle and monastery. The market is on Saturday, the fair on Whit-Monday. It has only sent members to parliament since the reign of Edward IV.

Eye || Ezra.

Eye-Bright. See EUPHRASIA.

EYMOUTH, a town of Scotland in the county of Berwick, formerly fortified to curb the garrison of Berwick, from which place it is distant six miles. W. Long. 1. 50. N. Lat. 55. 50. It gave title of baron in the kingdom of Scotland to Churchill, afterwards the great Duke of Marlborough; but he having no male issue, it became extinct in him.

EYRAC, or IRAC, ARABIA, a province of Turkey in Asia, 345 miles in length, and 190 in breadth; of which BAGDAD is the capital.

Eyrac Agemi, the principal province of Persia, anciently called PARTHIA.

EYRE, or EIRE, in law, the court of itinerant justices. See ASSIZE.

EYRIE, in falconry, a brood or nest, a place where hawks build and hatch their young.

EZEKIEL, a canonical book of the Old Testament, referring chiefly to the degenerate manners and corruptions of the Jews of those times. It abounds with fine sentences and rich comparisons, and discovers a good deal of learning in profane matters.

Ezekiel was carried captive to Babylon with Jechoniah, and began his prophesies in the fifth year of the captivity. He was cotemporary with Jeremiah, who prophesied at the same time in Judea. He foretold many events, particularly the destruction of the temple, the fatal catastrophe of those who revolted from Babylon to Egypt, and the happy return of the Jews to their own land.

EZION-GABER. See ASIONGABER.

EZRA, a canonical book of the Old Testament; comprehending the history of the Jews from the time of Cyrus's edict for their return, to the 20th year of Artaxerxes Longimanus. It specifies the number of Jews who returned, and Cyrus's proclamation for the rebuilding the temple, together with the laying its foundation, the obstruction it met with, and the finishing thereof in the reign of Darius.

The illustrious author of this book was also the restorer and publisher of the canon of the Old Testament. See BIBLE.

The books of Ezra, called in the English version the *First and Second Books of Esdras*, though held by some, particularly the Greeks, for canonical, are thrown by the English church into the number of apocryphal books, being only extant in Greek.

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F.

F
||
Fabian.

F, THE fourth conſonant, and ſixth letter of the alphabet. The letter F is borrowed from the digamma or double gamma of the Ælians, as is evident from the inſcription on the pedeſtal of the Coloſſus at Delos; and was undoubtedly formed from the old Hebrew vau: and though this letter is not found in the modern Greek alphabet, yet it was in the ancient one, from whence the Latins received it and tranſmitted it to us.

It is formed by a ſtrong expreſſion of the breath, and joining at the ſame time the upper-teeth and under-lip. It has but one ſort of ſound, which has a great affinity with *v* and *ph*, the latter being written for it by us in all Greek words, as *philoſophy*, &c. though the Italians write it *filoſofia*.

The Romans for ſome time uſed an inverted F, Ⅎ, inſtead of V conſonant, which had no peculiar figure in their alphabet. Thus, in inſcriptions we meet with TERMINAⅎIT, DIⅎI, &c. Lipſius and others ſay, that it was the emperor Claudius who introduced the uſe of the inverted digamma, or Ⅎ: but it did not long ſubſiſt after his death; for Quintilian obſerves, that it was not uſed in his time.

F, or FA, in muſic, is the fourth note in riſing in this order of the gamut, *ut*, *re*, *mi*, *fa*. It likewiſe denotes one of the Greek keys in muſic, deſtined for the baſs.

F, in phyſical preſcriptions ſtands for *Fiat*, or "Let it be done." Thus *f. s. a.* ſignifies *fiat ſecundum artem*.

F was alſo a numeral letter, ſignifying 40; according to the verſe,

Sexta quaterdenos gerit quæ diſtat ab alpha.

And when a daſh was added at top, thus $\overline{F}$, it ſignified forty thouſand.

F, in the civil law. Two f's joined together thus, *ff*, ſignify the pandects. See PANDECTS.

F, in criminal law, a ſtigma or brand put upon felons with a hot iron, on their being admitted to the benefit of clergy; by ſtat. 4 H. 7. c. 13.

FABA, in botany. See VICIA.

FABAGO, in botany; a ſpecies of bean-caper, or ZYGOPHYLLUM.

FABER, in ichthyology; a ſpecies of ZEUS.

FABIAN (Robert), an alderman of the city of London, and ſheriff in the year 1494; was a perſon of learning for the time he lived in, a good poet, and author of a Chronicle of England and France, intitled *The Concordaunce of Stories*, in two volumes folio, beginning with Brute, and ending with the 20th of Henry VII. 1504. It contains ſeveral curious particulars relative to the city of London, not elſewhere to be found. Stowe calls it "a painful labour, to the great honour of the city and of the whole realm." We are told that Cardinal Wolſey cauſed as many copies of this book as he could procure to be burned, because the author had made too clear a diſcovery of the large revenues of the clergy. Fabian died in 1512.

Fabii,
Fabius.

FABII, a noble and powerful family at Rome, who derived their name from *faba*, a bean, becauſe ſome of their anceſtors cultivated this pulſe. They were once ſo numerous that they took upon themſelves to wage a war againſt the Veientes. They came to a general engagement near the Cremera, in which all the family, conſiſting of 306 men, were totally ſlain, year of Rome 277. There only remained one whoſe tender age had detained him at Rome, and from him aroſe the noble Fabii in the following ages.

FABIUS (Maximus Rullianus), was the firſt of the Fabii who obtained the ſurname of *Maximus*, for leſſening the power of the populace at elections. He was maſter of horſe, and his victory over the Samnites in that capacity nearly coſt him his life, becauſe he engaged the enemy without the command of the dictator. He was five times conſul, twice dictator, and once cenſor. He triumphed over ſeven different nations in the neighbourhood of Rome, and rendered himſelf illuſtrious by his patriotiſm.

FABIUS (Ruſticus), an hiſtorian in the age of Claudius and Nero. He was intimate with Seneca; and the encomiums which Tacitus paſſes upon his ſtyle, make us regret the loſs of his compoſitions.

Q. FABIUS (Maximus), a celebrated Roman, who from a dull and inactive childhood was raiſed to the higheſt offices of the ſtate. In his firſt conſulſhip he obtained a victory over Liguria, and the fatal battle of Thraſymenus occaſioned his election to the dictatorſhip. In this important office he began to oppoſe Hannibal, not by fighting him in the open field, like his predeceſſors, but he continually haraſſed his army by countermarches and ambuſcades, from which he received the ſurname of *Cunctator*, or *Delayer*. Hannibal ſent him word, that "If he was as great a captain as he would be thought, he ought to come into the plain and give him battle." But Fabius coldly replied, "That if he was as great a captain as he would be thought, he would do well to force him to fight." Such operations for the commander of the Roman armies gave offence to ſome; and Fabius was even accuſed of cowardice. He, however, continued firm in his firſt reſolutions; and patiently bore to ſee his maſter of horſe raiſed to ſhare the dictatorial dignity with himſelf, by means of his enemies at home. When he had laid down his office of dictator, his ſucceſſors, for a while, followed his plan; but the raſhneſs of Varro, and his contempt for the operations of Fabius, occaſioned the fatal battle of Cannæ. Tarentum was obliged to ſurrender to his arms after the battle of Cannæ; and on that occaſion the Carthaginian enemy obſerved that Fabius was the Hannibal of Rome. When he had made

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Fabius || Fabri.

made an agreement with Hannibal for the ranſom of the captives, which was totally diſapproved by the Roman ſenate, he ſold all his eſtates to pay the money, rather than forfeit his word to the enemy. The bold propoſals of young Scipio to go and carry the war from Italy to Africa, was rejected by Fabius as chimerical and dangerous. He did not, however, live to ſee the ſucceſs of the Roman arms under Scipio, and the conqueſt of Carthage by meaſures which he treated with contempt and heard with indignation. He died in the 100th year of his age, after he had been five times conſul, and twice honoured with a triumph. The Romans were ſo ſenſible of his great merit and ſervices, that the expences of his funeral were defrayed from the public treaſury.—His ſon bore the ſame name, and ſhowed himſelf worthy of his noble father's virtues. During his conſulſhip he received a viſit from his father on horſeback in the camp. The ſon ordered the father to diſmount; and the old man cheerfully obeyed, embracing his ſon, and ſaying, "I wiſhed to know whether you knew what it is to be conſul." He died before his father, and Cunctator with the moderation of a philoſopher delivered a funeral oration over the dead body of his ſon.

FABIUS, ſtyled *Pictor*, a Roman general and hiſtorian. He firſt introduced painting at Rome; and having cauſed the walls of the temple of Health to be painted, ſome authors have erroneouſly reckoned him a painter. He died about 216 B. C.

FABLE, a tale, or feigned narration, deſigned either to inſtruct or divert, diſguiſed under the allegory of an action, &c.

Fables were the firſt pieces of wit that made their appearance in the world; and have continued to be highly valued, not only in times of the greateſt ſimplicity, but in the moſt polite ages of the world. Jotham's fable of the trees is the oldeſt that is extant, and as beautiful as any that have been made ſince. Nathan's fable of the poor man is next in antiquity. We find Æſop in the moſt diſtant ages of Greece; and in the early days of the Roman commonwealth, we read of a mutiny appeaſed by the fable of the belly and the members. As fables had their riſe in the very infancy of learning, they never flouriſhed more than when learning was at its greateſt height; witneſs Horace, Boileau, and Fontaine.

Fable is the fineſt way of giving counſel, and moſt univerſally pleaſing, becauſe leaſt ſhocking; for, in the reading of a fable, a man thinks he is directing himſelf, whilſt he is following the dictates of another, and conſequently is not ſenſible of that which is the moſt unpleaſing circumſtance in advice. Beſides, the mind is never ſo much pleaſed as when ſhe exerts herſelf in any action that gives her an idea of her own abilities; this natural pride of the ſoul is very much gratified in the reading of fable.

FABLE, is alſo uſed for the plot of an epic or dramatic poem; and is, according to Ariſtotle, the principal part, and, as it were, the ſoul of the poem. See POETRY.

FABRI (Honorius), a laborious Jeſuit born in the dioceſe of Bellay, diſtinguiſhed himſelf by his ſkill in philoſophy and the mathematics, and by writing a great number of books. The moſt curious of which treat of geometry, optics, the loadſtone, the motion of the earth, the ebbing and flowing of the ſea, &c. He died at Rome in 1688.

Fabriand || Fabricius.

FABRIANO (Gentile da), painter of hiſtory, was born at Verona in 1332, and became a diſciple of Giovanni da Fieſole. In that early age of painting he rendered himſelf very famous, and was employed to adorn a great number of churches and palaces at Florence, Urbino, Siena, Peruſia, and Rome, but particularly in the Vatican; and one picture of his, repreſenting the Virgin and Child, attended by Joſeph, which is preſerved in the church of S. Maria Maggiore, was highly commended by Michael Angelo. By order of the Doge and Senate of Venice, he painted a picture in the great council-chamber, which was conſidered as ſo extraordinary a performance, that his employers granted him a penſion for life, and conferred on him the higheſt honour of their ſtate, which was, the privilege of wearing the habit of a noble Venetian. He died in 1412.

FABRIC, in general, denotes the ſtructure or conſtruction of any thing; but particularly of buildings, as a church, hall, houſe, &c. See ARCHITECTURE.

FABRIC-Lands, thoſe formerly given towards rebuilding or repairing of cathedrals and other churches; for anciently almoſt every body gave more or leſs, by his will, to the fabric of the pariſh-church where he dwelt.

FABRICIUS (C.), a celebrated Roman, who in his firſt conſulſhip, year of Rome 470, obtained ſeveral victories over the Samnites and Lucanians, and was honoured with a triumph. The riches which were acquired in thoſe battles were immenſe, the ſoldiers were liberally rewarded by the conſul, and the treaſury was enriched with 400 talents. Two years after, Fabricius went as ambaſſador to Pyrrhus, and refuſed with contempt preſents, and heard with indignation offers, which might have corrupted the fidelity of a leſs virtuous citizen. Pyrrhus had occaſion to admire the magnanimity of Fabricius; but his aſtoniſhment was more powerfully awakened when he ſaw him make a diſcovery of the perfidious offers of his phyſician, who pledged himſelf to the Roman general for a ſum of money to poiſon his royal maſter. To this greatneſs of ſoul was added the moſt conſummate knowledge of military affairs, and the greateſt ſimplicity of manners. Fabricius never uſed rich plate at his table. A ſmall ſalt-cellar, the feet of which were of horn, was the only ſilver veſſel which appeared in his houſe. This contempt of luxury and uſeleſs ornaments Fabricius wiſhed to inſpire among the people; and during his cenſorſhip he baniſhed from the ſenate Cornelius Ruffinus, who had been twice conſul and dictator, becauſe he kept in his houſe more than ten pound weight of ſilver plate. Such were the manners of the conqueror of Pyrrhus, who obſerved that he wiſhed rather to command thoſe that had money, than poſſeſs it himſelf. He lived and died in the greateſt poverty. His body was buried at the public charge, and the Roman people were obliged to give a dowry to his two daughters when they had arrived to years of maturity.

FABRICIUS (George), a learned German, born at Chenmitz in Miſnia, in 1516. After a liberal education, he viſited Italy in quality of a tutor to a young nobleman; and, examining all the remains of antiquity with great accuracy, compared them with their deſcriptions

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Fabricius
Fabulous.

scriptions in Latin writers. The result of these observations was his work intitled *Roma*, containing a description of that city. He afterwards settled at Misenum, where he conducted a great school to the time of his death in 1571. He was also the author of a great number of sacred Latin poems, wrote seven books of the *Annals of Misnia*, three of the *Annals of Meissen*, and *Travels*.

Fabricius (Jerom), a celebrated physician in the latter end of the 16th century (surnamed *Aquapendente*, from the place of his birth), was the disciple and successor of Fallopius. He chiefly applied himself to surgery and anatomy, which he professed at Padua for 40 years with extraordinary reputation. The republic of Venice settled a large pension upon him, and honoured him with a gold chain and a statue. He died in 1603; leaving behind him several works which are much esteemed.

Fabricius (John Albert), one of the most learned and laborious men of his age, was born at Leipsic in 1668. He was chosen professor of eloquence at Hamburgh in 1699, and was made doctor of divinity at Kiel. His works are numerous; and he died at Hamburgh in 1736, after a life spent in the severest literary application to collect and publish valuable remains of ancient learning.

Fabricius (Vincent), born at Hamburgh in 1613, was a good poet, a great orator, an able physician, and a learned civilian. He was for some time counsellor to the bishop of Lubec, and afterward burgomaster and syndic of the city of Dantzic; from whence he was 13 times sent deputy into Poland, where he died at Warsaw in 1657, during the diet of that kingdom. The most complete edition of Fabricius's poems and other works was published at Leipsic in 1685, under the direction of his son Frederic Fabricius.

Fabricius (Baron), one of the finest gentlemen of his time, and known to the public by his letters relating to the transactions of Charles XII. of Sweden during his residence in the Ottoman empire, was descended from a good family in Germany. He was taken early into the service of the court of Holstein; and was sent in a public character to the king of Sweden whilst he was at Bender; where he soon acquired the good graces of that prince. He accompanied him in his exercises; gave him a turn for reading; and it was out of his hand Charles snatched Boileau's satires, when he tore out those that represented Alexander the Great as a madman. Fabricius was also in favour with Stanislaus, and with our king George I. whom he accompanied in his last journey to Hanover, and was with him when he died. A translation of his letters was published in London 1761.

FABROT (Charles Hannibal), one of the most celebrated civilians of his time, was born at Aix in 1681; and acquired an extraordinary skill in the civil and canon law, and in the belles lettres. He published the *Basilicæ*, or Constitutions of the Emperors of the East, in Greek and Latin, with learned notes, in seven vols folio; and editions of *Cedrenus*, *Nicetas*, *Anastasius*, *Bibliothecarius*, *Constantine Manasses*, and *Cujas*, with learned and curious notes.

FABULOUS, something consisting of, or connected with, a fable.

Fabulous Age, among ancient historians. See Age.

Face
Factor.

FACE, the surface, or first side which a body presents to the eye. We say, the *face* of the earth, of the waters, &c. Polyhedrons have several *faces*. A die, or cube, has six *faces*.

Face, is particularly used for the visage of an animal, and especially of man; and comprehends, in the latter, all that part of the head which is not covered with the common long hair. The Latins call it *facies*, *vultus*, *os*, &c.

The human face is called the *image of the soul*, as being the seat of the principal organs of sense; and the place where the ideas, emotions, &c. of the soul are chiefly set to view. Pride and disdain are shown in the eye-brows, modesty on the cheeks, majesty in the forehead, &c. It is the face shows the sex, age, temperament, health, or disease, &c.

The face, considered as the index of the passions, habits, &c. of the person, makes the subject of physiognomy. See Physiognomy.

Face, among painters and artists, is used to denote a certain dimension of the human body, adopted for determining the proportion which the several parts should bear to one another. See Drawing.

Face, in the military art, a word of command, intimating to turn about: thus, *face to the right*, is to turn upon the left heel a quarter-round to the right; and, *face to the left*, is to turn upon the right heel a quarter-round to the left.

FACIES Hippocratica, in medicine, is when the nostrils are sharp, the eyes hollow, the temples low, the tips of the ears contracted and cold, the forehead dry and wrinkled, and the complexion pale or livid.—The Hippocratic face is chiefly observed towards the period of phthises and other consumptions, and is held a sure prognostic of death. If it appears within three days after the attack of an acute disease, it is deemed to indicate death.

FACTION, a cabal or party formed in a state, city, or company.

Faction, in antiquity, a name given to the different companies of combatants in the circus. They were four, viz. the white, the red, the green, and the blue; to which Domitian added another of purple colour. They were so denominated from the colour of the liveries they wore; and were dedicated, according to M. Aur. Cassiodorus, to the four seasons of the year; the green being consecrated to spring, the blue to winter, the red to summer, and the white to autumn. It appears from ancient inscriptions, that each faction had its procurators and physician; and from history, that party-rage ran so high among them, that in a dissension between two factions, in the time of Justinian, almost 40,000 men lost their lives in the quarrel.

FACTITIOUS, any thing made by art, in opposition to what is the produce of nature. Thus, factitious cinnabar is opposed to native cinnabar.

FACTOR, in commerce, is an agent employed by merchants residing at other places, to buy or sell goods, or negociate bills, or transact any kind of business on their account; and intitled to a certain allowance for his trouble.

A supercargo differs from a factor in this: The business of the former is limited to the care of a particular cargo; he goes along with it, and generally returns when his business is completed: the latter has a fixed

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Factor. fixed reſidence abroad, and executes buſineſs for different merchants. But their duties, and the circumſtances for which they are accountable, are the ſame.

The duty of a factor is to procure the beſt intelligence of the ſtate of trade at his place of reſidence; of the courſe of exchange; of the quantity and quality of goods at market, their preſent price, and the probability that it may riſe or fall; to pay exact obedience to the orders of his employers; to conſult their advantage in matters referred to his direction; to execute their buſineſs with all the diſpatch that circumſtances admit; to be early in his intelligence, diſtinct in his accounts, and punctual in his correſpondence.

A factor's power is either abſolute or limited. Tho' intruſted with ample diſcretionary powers, he is not warranted to take unreaſonable or unuſual meaſures, or do any thing contrary to his employer's intereſt; but it is incumbent on the employer, if he challenge his proceedings, to prove that he could have done better, and was guilty of wilful miſmanagement.

When a factor's power is limited, he muſt adhere ſtrictly to his orders. If he exceeds his power, though with a view to his employer's intereſt, he is liable for the conſequence. For example, if he gives credit when not empowered, or longer credit if not empowered, for the ſake of a better price, and the buyer proves inſolvent, he is liable for the debt. A factor has no power to give credit unleſs authoriſed: But if the goods conſigned be generally ſold on credit at the place of conſignation, the factor will be vindicated for ſelling at the uſual credit, unleſs expreſsly reſtricted.

Although opinion will never juſtify the factor for departing from orders, neceſſity ſometimes will. If he be limited not to ſell goods under a certain price, and the goods be periſhable, and not in a ſituation for being kept, he may ſell them, to prevent their deſtruction, even under the price limited.

A factor is never warranted to deal on truſt, except with perſons in good credit at the time. If the employer challenge the debtors, it is incumbent on him to prove that their bad circumſtances was known at the time of ſale; and the factor will be vindicated, if he truſted them at the ſame time for goods of his own.

If the factor ſells his employer's goods on truſt, and, after the day of payment is elapſed, receive payment from the purchaſer for a debt of his own, he becomes liable in equity for the debt.

In caſe of bankruptcy, the factor ought immediately to lay attachments, and adviſe his employers; and he cannot withdraw his attachments, nor compound debts without orders.

If a factor ſells goods belonging to different merchants to the ſame perſon, and the buyer proves inſolvent, they ſhall bear the loſs in equal proportions; and, if the buyer has paid part before his inſolvency, without ſpecifying for which, the payment ought to be diſtributed in equal proportions; but, if the days of payment be fixed, and part of the debts only due, the payment ought to be applied, in the firſt place, to ſuch debts as were due.

If he makes a wrong entry at the cuſtom-houſe, and the goods be ſeized in conſequence thereof, he muſt bear the loſs, unleſs the error be occaſioned by a miſtake in the invoice, or letter of advice.

The owner bears the loſs of goods ſeized when attempted to be ſmuggled by his orders; but the factor complying with an unlawful order is liable in ſuch penalties as the laws exact. Factor || Faculæ.

If a factor ſaves the duty of goods due to a foreign prince, he ſhall have the benefit; for, if detected, he bears the loſs.

If a factor ſells goods bought by his employer's orders for his own advantage, the employer may recover the benefit, and the factor ſhall be amerced for the ſame.

If a factor receives bad money in payment, he bears the loſs; but if the value of the money be leſſened by the government, the employer bears the loſs.

A factor is not liable for goods ſpoiled, robbed, or deſtroyed by fire.

If a factor receives counterfeit jewels from his employer, and ſells them, the employer is liable to indemnify him for any penalties he may incur.

If a factor be ordered to make inſurance, and neglect it, and the ſubject be loſt, he is liable to make it good, providing he had effects in his hands.

If a factor buys goods for his employer, his bargain ſhall be binding on the employer.

In caſe of a factor's inſolvency, the owner may reclaim his goods; and, if they be ſold on truſt, the owner (and not the factor's creditors) ſhall recover payment of the debts.

FACTOR, in multiplication, a name given to the multiplier and multiplicand, becauſe they conſtitute the product. See ARITHMETIC.

FACTORAGE, called alſo *commiſſion*, is the allowance given to factors by the merchant who employs them.

A factor's commiſſion in Britain, on moſt kinds of goods, is $2\frac{1}{2}$ *per cent.*; on lead, and ſome other articles, 2 *per cent.*; in Italy, $2\frac{1}{2}$ *per cent.*; in France, Holland, Spain, Portugal, Hamburgh, and Dantzick, 2 *per cent.*; in Turkey, 3 *per cent.*; in North America, 5 *per cent.* on ſales, and 5 *per cent.* in returns; in the Weſt Indies, 8 *per cent.* for commiſſion and ſtorage. In ſome places, it is cuſtomary for the factors to inſure the debts for an additional allowance, generally $1\frac{1}{2}$ *per cent.* In that caſe, they are accountable for the debt when the uſual term of credit is expired.

Factorage on goods is ſometimes charged at a certain rate per caſk, or other package, meaſure, or weight, eſpecially when the factor is only employed to receive or deliver them.

FACTORY is a place where a conſiderable number of factors reſide, to negotiate for their maſters or employers. See FACTOR.

The moſt conſiderable factories belonging to the Britiſh are thoſe eſtabliſhed in the Eaſt-Indies, Portugal, Turkey, &c. There are alſo Engliſh factories eſtabliſhed at Hamburg, Peterſburg, Dantzic, and in Holland; all endowed with certain privileges.

FACTUM, in arithmetic, the product of two quantities multiplied by each other.

FACULÆ, in aſtronomy, certain bright and ſhining parts, which the modern aſtronomers have, by means of teleſcopes, obſerved upon or about the ſurface of the ſun: they are but very ſeldom ſeen.—The word is pure Latin; being a diminutive of *fax*, "torch;" and ſuppoſed:

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Faculty || Faernus.

poſed to be here applied from their appearing and diſappearing by turns.

FACULTY, in law, a privilege granted to a perſon, by favour and indulgence, of doing what, by law, he ought not to do.

For granting theſe privileges, there is a court under the archbiſhop of Canterbury, called the *court of the faculties*. The chief officer of this court is ſtyled *maſter of the faculties*, and has a power of granting diſpenſations in divers caſes; as, to marry without the bans being firſt publiſhed, to eat fleſh on days prohibited, to ordain a deacon under age, for a ſon to ſucceed his father in his benefice, a clerk to hold two or more livings, &c.

FACULTY, in the ſchools, a term applied to the different members of an univerſity, divided according to the arts and ſciences taught there: thus in moſt univerſities there are four faculties, viz. 1. Of arts, which include humanity and philoſophy. 2. Of theology. 3. Of phyſic. And, 4. Of civil law.

FACULTY of Advocates. See ADVOCATES.

FACULTY is alſo uſed to denote the powers of the human mind, viz. underſtanding, will, memory, and imagination. See METAPHYSICS.

FÆCES, in chemiſtry, the groſs matter, or ſediment, that ſettles at the bottom after diſtillation, fermentation, and the like.—The fæces of wine are commonly called LEES.

FÆCES, in medicine, the excrements voided by ſtool. See EXCREMENTS.

FÆCULENT, in general, is applied to things abounding with fæces or dregs: thus the blood and other humours of the human body are ſaid to be fæculent, when without that purity which is neceſſary to health.

FAENZA, a city of Romania in Italy, with a biſhop's ſee. It is an ancient place, and has undergone various revolutions. The river Amona waſhes its walls, and paſſes between the city and the ſuburbs, which are joined by a ſtone-bridge defended by two good towers. The city is remarkable for its earthen ware, which is the beſt in all Italy.

FAERNUS (Gabriel), a native of Cremona in Italy, was an excellent Latin poet and critic of the 16th century. He was ſo ſkilled in all parts of polite literature, that the cardinal de Medicis, afterward Pope Pius IV. was particularly fond of him. He was the author of ſome Latin elegies; of 100 Latin fables, ſelected from the ancients, written in iambic verſe; and of ſeveral pieces of criticiſm, as *Cenſura emendationum Livianarum*, *De Metris Comicis*, &c. He was remarkably happy in decyphering manuſcripts, and reſtoring ancient authors to their purity: he took ſuch pains with Terence in particular, that Bentley has adopted all his notes in the edition he gave of that writer. He died at Rome in 1561; and Thuanus, who wrote his eloge, ſays, that the learned world was greatly obliged to him, yet had been ſtill more ſo, if, inſtead of ſuppreſſing the then unknown fables of Phædrus, for fear of leſſening the value of his own Latin fables, written in imitation of Æſop, he had been content with imitating them. M. Perault, however, who tranſlated Faernus's fables into French, has defended him from this imputation, by affirming that the firſt MS. of Phædrus's fables, found in the duſt of an old library, was not diſcovered till about 30 year after Faernus's death.

Faera || Fagopyr.

FAGARA, IRON-WOOD: A genus of the monogynia order, belonging to the tetrandria claſs of plants; and in the natural method ranking under the 43d order, *Dumoſæ*. The calyx is quadrifid, the corolla tetrapetalous, and the capſule bivalved and monoſpermous. There are five ſpecies, all natives of the warm parts of America, riſing with woody ſtems more than 20 feet high. They are propagated by ſeeds; but in this country muſt be kept continually in a ſtove.

FAGE (Raimond de la), an excellent deſigner and engraver, highly eſteemed by Carlo Maratti, was born at Toulouſe in 1648. He applied himſelf to deſigning, through inclination, in ſpite of his parents; and had no maſter nor any aſſiſtance: but his ſuperior talents ſupplied the want of them, and he became one of the beſt deſigners in Europe; but his performances on licentious ſubjects are the moſt eſteemed. It is reported of this artiſt, that he never made uſe of money, but contracted debts; and when the accounts were brought him, he drew upon the back of the bills, and bid the owners ſell the drawings to connoiſſeurs for the amount, by which they were generally great gainers. Several of thoſe drawings are in the cabinets of the curious. He led a looſe, depraved life; which his repeated debaucheries put an end to at the age of 42.

FAENSA, a city and biſhop's ſee of Italy, ſituated in the pope's territories, about 30 miles eaſt of Bologna; E. Long. 12. 38. and N. Lat. 44. 30.

FAGGOT, in times of popery here, was a badge worn on the ſleeve of the upper garment of ſuch perſons as had recanted or abjured what was then termed *hereſy*; being put on after the perſon had carried a faggot, by way of penance, to ſome appointed place of ſolemnity. The leaving off the wear of this badge was ſometimes interpreted a ſign of apoſtacy.

FAGGOTS, among military men, perſons hired by officers, whoſe companies are not full, to muſter and hide the deficiencies of the company; by which means they cheat the king of ſo much money.

FAGIUS (Paul), *alias* BUCHLIN, a learned Proteſtant miniſter, born at Rheinzabem in Germany in 1504. He was a ſchoolmaſter at Iſna; but afterwards became a zealous preacher, and wrote many books. The perſecution in Germany menacing danger to all who did not profeſs the Romiſh doctrines, he and Bucer came over to England in 1549, at the invitation of archbiſhop Cranmer, to perfect a new tranſlation of the ſcriptures. Fagius took the Old Teſtament, and Bucer the New, for their reſpective parts; but the deſign was at that time fruſtrated by the ſudden deaths of both. Fagius died in 1550, and Bucer did not live above a year after. Their bodies were dug up and buried in the reign of queen Mary.

FAGONIA, in botany: A genus of the monogynia order, belonging to the decandria claſs of plants; and in the natural method ranking under the 14th order, *Gruinales*. The calyx is pentaphyllous; the petals are five, and heart-ſhaped; the capſule is quinquelocular, ten-valved, with the cells monoſpermous. There are three ſpecies, natives of Spain, Crete, and Arabia.

FAGOPYRUM, or BUCK-WHEAT. See POLYGONUM.

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Fagus. FAGUS, the BEECH-TREE: A genus of the polyandria order, belonging to the monoecia claſs of plants; and in the natural method ranking under the 50th order, *Amentaceæ*. The male calyx is quinquefid and campanulated; there is no corolla; the ſtamina are 12: The female calyx is quinquedentated; there is no corolla; there are three ſtyles; the capſule (formerly the calyx) is muricated and quadrivalved; the ſeeds, two in number. There are three ſpecies. 1. The ſylvaticus, or beech-tree, riſes 60 or 70 feet high, and has a proportionable thickneſs, branching upward into a fine regular head, garniſhed with oval ſerrated leaves, with flowers in globular catkins, ſucceeded by angular fruit called *maſt*. 2. The caſtanea, or cheſnut-tree, hath a large upright trunk growing 40 or 50 feet high, branching regularly round into a fine ſpreading head, garniſhed with large ſpear-ſhaped acutely ſerrated leaves naked on the under ſide, having flowers in long amentums, ſucceeded by round prickly fruit, containing two or more nuts. 3. The pumila, dwarf cheſnut-tree, or chinkapin, riſes eight or ten feet high, with a branching ſhrubby ſtem, and oval ſpear-ſhaped and acutely ſerrated leaves, hoary on the under ſide. Fagus.

Culture. The firſt is very eaſily raiſed from the maſt or ſeed. "For woods (ſays Evelyn), the beech muſt be governed as the oak:—In nurſeries, as the aſh; ſowing the maſts in autumn, or later, even after January, or rather nearer the ſpring, to preſerve them from vermin, which are very great devourers of them. But they are likewiſe to be planted of young ſeedlings to be drawn out of the places where the fruitful trees abound." Millar ſays, the ſeaſon for ſowing the maſts "is any time from October to February, only obſerving to ſecure the ſeeds from vermin when early ſowed, which, if carefully done, the ſooner they are ſown the better, after they are fully ripe." Hanbury orders a ſufficient quantity of maſts to be gathered about the middle of September, when they begin to fall: theſe are to be "ſpread upon a mat in an airy place ſix days to dry; and after that you may either proceed to ſow them immediately, or you may put them up in bags in order to ſow them nearer the ſpring; which method I would rather adviſe, as they will keep very well, and there will be leſs danger of having them deſtroyed by mice or other vermin, by which kinds of animals they are greatly reliſhed." They muſt be ſown in beds properly prepared about an inch deep. In the firſt ſpring many of the young plants will appear, whilſt others will not come up till the ſpring following. Having ſtood two years in the ſeminary, they ſhould be removed to the nurſery, where they may remain till wanted.

The propagation of the ſecond ſpecies is alſo chiefly from ſeeds. Evelyn ſays, "Let the nuts be firſt ſpread to ſweat, then cover them in ſand; a month being paſt, plunge them in water, and reject the ſwimmers; being dried for 30 days more, ſand them again, and to the water-ordeal as before. Being thus treated until the beginning of ſpring or in November, ſet them as you would do beans; and, as ſome practiſe it, drenched for a night or more in new milk; but with half this preparation they need only to be put into the holes with the point upmoſt, as you plant tulips. If you deſign to ſet them in winter or autumn, I counſel you to inter them in their huſks, which being every way armed, are a good protection againſt the mouſe, and a providential integument."—"Being come up, they thrive beſt unremoved, making a great ſtand for at leaſt two years upon every tranſplanting; yet if needs you muſt alter their ſtation, let it be done about November." Millar cautions us againſt purchaſing foreign nuts that have been kiln-dried, which (he ſays) is generally done to prevent their ſprouting in their paſſage; therefore he adds, "If they cannot be procured freſh from the tree, it will be much better to uſe thoſe of the growth of England, which are full as good to ſow for timber or beauty as any of the foreign nuts, though their fruit is much ſmaller." He alſo recommends preſerving them in ſand, and proving them in water. In ſetting theſe ſeeds or nuts (he ſays) "the beſt way is to make a drill with a hoe (as is commonly practiſed for kidney-beans) about four inches deep, in which you ſhould place the nuts, at about four inches diſtance, with their eye uppermoſt; then draw the earth over them with a rake, and make a ſecond drill at about a foot diſtance from the former, proceeding as before, allowing three or four rows in each bed.—In April (he does not mention the time of ſowing) theſe nuts will appear above-ground; you muſt therefore obſerve to keep them clear from weeds, eſpecially while young: in theſe beds they may remain for two years, when you ſhould remove them into a nurſery at a wider diſtance. The beſt time for tranſplanting theſe trees is either in October or the latter end of February, but October is the beſt ſeaſon: the diſtance theſe ſhould have in the nurſery is three feet row from row, and one foot in the rows. If theſe trees have a downright tap-root, it ſhould be cut off, eſpecially if they are intended to be removed again: this will occaſion their putting out lateral ſhoots, and render them leſs ſubject to miſcarry when they are removed for good. The time generally allowed them in the nurſery is three or four years, according to their growth; but the younger they are tranſplanted, the better they will ſucceed. Young trees of this ſort are very apt to have crooked ſtems; but when they are tranſplanted out and have room to grow, as they increaſe in bulk they will grow more upright, and their ſtems will become ſtraight, as I have frequently obſerved where there have been great plantations."—Hanbury follows Millar almoſt literally; except that he mentions February as the time of ſowing; and recommends that the young plants, a year after they have been planted in the nurſery, be cut down to within an inch of the ground; which (he ſays) "will cauſe them to ſhoot vigorouſly with one ſtrong and ſtraight ſtem." There is one material objection againſt ſowing cheſnuts in drills, which are well known to ſerve as guides or conductors to the field-mouſe, who will run from one end to the other of a drill without letting a ſingle nut eſcape her: we rather recommend ſetting them with a dibble, either promiſcuouſly or a quincunx, at about ſix inches diſtance. Evelyn ſays, that coppices of cheſnuts may be thickened by layering the tender young ſhoots; but adds, that "ſuch as ſpring from the nuts and marrons are beſt of all." There is a ſtriped-leaved variegation which is continued by budding; and the French are ſaid to graft cheſnuts for their fruit; but Millar ſays, ſuch grafted trees are unfit for timber. The cheſnuts will thrive

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Fagus. thrive upon almoſt any ſoil which lies out of the water's way; but diſaffects wet moory land.

The method of propagating the dwarf cheſnut is from ſeeds, which we receive from America. Theſe ſhould be planted in drills, as ſoon as they arrive, in a moiſtiſh bed of rich garden-mould. If the ſeeds are good, they will come up pretty ſoon in the ſpring. After they appear, they will require no trouble, except keeping them clean from weeds, and watering them in dry weather. They may ſtand in the ſeed-bed two years, and be afterwards planted in the nurſery-ground, at a foot aſunder and two feet diſtance in the rows; and here when they are got ſtrong plants, they will be fit for any purpoſe.

Properties and Uſes. In ſtatelineſs and grandeur of outline, the beech vies with the oak. Its foliage is peculiarly ſoft and pleaſing to the eye; its branches are numerous and ſpreading; and its ſtem waxes to a great ſize. The bark of the beech is remarkably ſmooth, and of a ſilvery caſt; this, added to the ſplendor and ſmoothneſs of its foliage, gives a ſtriking neatneſs and delicacy to its general appearance. The beech, therefore, ſtanding ſingly, and ſuffered to form its own natural head, is highly ornamental; and its leaves varying their hue as the autumn approaches, renders it in this point of view ſtill more deſirable. In point of actual uſe the beech follows next to the oak and the aſh: it is almoſt as neceſſary to the cabinet-makers and turners (eſpecially about the metropolis), as the oak is to the ſhip-builder, or the aſh to the plough and cart wright. Evelyn nevertheleſs condemns it in pointed and general terms; becauſe "where it lies dry, or wet and dry, it is exceedingly obnoxious to the worm." He adds, however, "but being put ten days in water, it will exceedingly reſiſt the worm." The natural ſoil and ſituation of the beech is upon dry, chalky, or limeſtone heights: It grows to a great ſize upon the hills of Surry and Kent; as alſo upon the declivities of the Cotſwold and Stroudwater hills of Glouceſterſhire, and flouriſhes exceedingly upon the bleak banks of the Wye, in Hereford and Monmouth ſhires; where it is much uſed in making charcoal. In ſituations like thoſe, and where it is not already prevalent, the beech, whether as a timber-tree or as an underwood, is an object worthy the planter's attention.

The maſt, or ſeeds, yield a good oil for lamps; and are a very agreeable food to ſquirrels, mice, and ſwine. The fat of ſwine fed with them, however, is ſoft, and boils away unleſs hardened by ſome other food. The leaves gathered in autumn, before they are much injured by the froſts, make much better matraſſes than ſtraw or chaff; and laſt for ſeven or eight years. The nuts, when eaten by the human ſpecies, occaſion giddineſs and headach; but when well dried and powdered, they make wholeſome bread. They are ſometimes roaſted, and ſubſtituted for coffee. The poor people in Sileſia uſe the expreſſed oil inſtead of butter.

The *cheſnut-tree* ſometimes grows to an immenſe ſize. The largeſt in the known world are thoſe which grow upon Mount Ætna in Sicily *. At Tortworth in Glouceſterſhire, is a cheſnut tree 52 feet round. It is proved to have ſtood there ever ſince the year 1150, and was then ſo remarkable that it was called the *great cheſnut of Tortworth*. It fixes the boundary of the manor, and is probably near 1000 years old. As an ornamental, the cheſnut, tho' unequal to the oak, the beech, and the eſculus, has a degree of greatneſs belonging to it which recommends it ſtrongly to the gardener's attention. Its uſes have been highly extolled; and it may deſerve a conſiderable ſhare of the praiſe which has been given it. As a ſubſtitute for the oak, it is preferable to the elm: For door-jambs, window-frames, and ſome other purpoſes of the houſe-carpenter, it is nearly equal to oak itſelf; but it is very apt to be ſhakey, and there is a deceitful brittleneſs in it which renders it unſafe to be uſed as beams, or in any other ſituation where an uncertain load is required to be borne. It is univerſally allowed to be excellent for liquor caſks; as not being liable to ſhrink, nor to change the colour of the liquor it contains: it is alſo ſtrongly recommended as an underwood for hop-poles, ſtakes, &c. Its fruit too is valuable, not only for ſwine and deer, but as a human food: Bread is ſaid to have been made of it. Upon the whole, the cheſnut, whether in the light of ornament or uſe, is undoubtedly an object of the planter's notice.

* See *Etna*, n° 18. and Plate CLXXXV

Faint || Fair.

FAINT-ACTION, in law, a feigned action, or ſuch as, although the words of the writ are true, yet, for certain cauſes, the plaintiff has no title to recover thereby.

FAINT-Pleader, in law, a covinous, falſe, or colluſory manner of pleading, to the deceit of a third perſon.

FAINTING. See LIPOTHYMIA.

FAINTS, in the diſtillery, the weak ſpirituous liquor that runs from the ſtill in rectifying the low wines after the proof-ſpirit is taken off.

FAINTS, is alſo the laſt runnings of all ſpirits diſtilled by the alembic. The clearing the worm of theſe is ſo eſſential a point in order to the obtaining a pure ſpirit by the ſubſequent diſtillation, that all others are fruitleſs without it.

FAIR, a greater kind of market, granted to a town, by privilege, for the more ſpeedy and commodious providing of ſuch things as the place ſtands in need of.

The word fair, is formed from the French *foire*, which ſignifies the ſame thing; and *foire* is by ſome derived from the Latin *forum*, "market;" by others from the Latin *feriæ*, becauſe anciently fairs were always held in the places where the wakes, or feaſts of the dedications of churches, called *feriæ*, were held. See FERIÆ.

It is incident to a fair, that perſons ſhall be free from being arreſted in it for any other debt or contract than what was contracted in the ſame; or, at leaſt, promiſed to be paid there. Theſe fairs are generally kept once or twice a-year; and, by ſtatute, they ſhall not be held longer than they ought, by the lords thereof, on pain of their being ſeized into the king's hands, &c. Alſo proclamation is to be made, how long they are to continue; and no perſon ſhall ſell any goods after the time of the fair is ended, on forfeiture of double the value, one fourth to the proſecutor and the reſt to the king. There is a toll uſually paid in fairs on the ſale of things, and for ſtallage, picage, &c.

Fairs abroad are either free, or charged with toll and impoſt. The privileges of free fairs conſiſt chiefly, firſt, in that all traders, &c. whether natives or foreigners, are allowed to enter the kingdom, and are under the royal protection, exempt from duties, im-

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Fair. positions, tolls, &c. Secondly, that merchants, in going or returning, cannot be moleſted or arreſted, or their goods ſtopped. They are eſtabliſhed by letters-patent from the prince. Fairs, particularly free fairs, make a very conſiderable article in the commerce of Europe, eſpecially that of the Mediterranean, and inland parts of Germany. &c. Fair.

The moſt celebrated fairs in Europe are thoſe, 1. Of Francfort, held twice a-year, in ſpring and autumn: the firſt commencing the Sunday before Palm-Sunday, and the other on the Sunday before the eighth of September. Each laſts 14 days, or two weeks; the firſt of which is called the *week of acceptance*, and the ſecond the *week of payment*. They are famous for the ſale of all kinds of commodities; but particularly for the immenſe quantity of curious books no where elſe to be found, and whence the bookſellers throughout all Europe uſed to furniſh themſelves. Before each fair, there is a catalogue of all the books to be ſold thereat, printed and diſperſed, to call together purchaſers: though the learned complain of divers unfair practices therein; as fictitious titles, names of books purely imaginary, &c. beſide great faults in the names of the authors, and the titles of the real books. —2. The fairs of Leipſick, which are held thrice a-year: one beginning on the firſt of January; another three weeks after Eaſter; and a third after Michaelmas. They hold 12 days a-piece; and are at leaſt as conſiderable as thoſe of Francfort. 3. The fairs of Novi, a little city in the Milaneſe, under the dominion of the republic of Genoa. There are four in the year, commencing on the ſecond of February, the ſecond of May, the firſt of Auguſt, and ſecond of September. Though the commodities bought and ſold here be very conſiderable; yet, what chiefly contributes to render them ſo famous, is the vaſt concourſe of the moſt conſiderable merchants and negociants of the neighbouring kingdoms, for the tranſacting of affairs and ſettling accounts. 4. The fairs of Riga, whereof there are two in the year; one in May, and the other in September. They are much frequented by the Engliſh, Dutch, and French ſhips, as alſo from all parts of the Baltic. The beſt time for the ſale of goods at Riga is during the fairs. Since the building of the famous city of Peterſburg, theſe fairs have ſuffered ſome diminution. 5. Fair of Archangel, during which all the trade foreigners have with that city is managed. It holds a month, or ſix weeks at moſt, commencing from the middle of Auguſt. The Muſcovite merchants attend here from all parts of that vaſt empire; and the Engliſh, Dutch, French, Swediſh, Daniſh, and other ſhips in the port of that city, on this occaſion, ordinarily amount to 300. But this is no free fair as the reſt are: The duties of exportation and importation are very ſtrictly paid, and on a very high footing. 6. The fair of St Germain, one of the ſuburbs of Paris, commencing on the third of February, and holding till Eaſter; though it is only free for the firſt 15 days. 7. The fairs of Lyons, which Monſ. du Cheſne, in his antiquity of cities, would inſinuate, from a paſſage in Strabo, were eſtabliſhed by the Romans; though it is certain, the fairs, as they now ſtand, are of a much later date. There are three in the year, each laſting 20 days, and free for ever. They begin on Eaſter Monday, the 26th of July, and the firſt of December. 8. Fair of Guibray, a ſuburb of the city of Falaiſe, in the Lower Normandy. It is ſaid to have been eſtabliſhed by our William the Conqueror, in conſideration of his being born at Falaiſe. It commences on the 16th of Auguſt; and holds 15 days free by charter, and longer by cuſtom. 9. Fair of Beaucaire, held partly in a city of that name, in Languedoc, and partly in the open country, under tents, &c. It commences on the 22d of July, and only holds for three days; yet it is the greateſt and moſt celebrated of all the fairs in that part of Europe, both for the concourſe of ſtrangers from all parts of the world, and for the traffic of all kind of goods: the money returned in theſe three days amounting ſometimes to above ſix millions of livres.

The fairs of Porto-bello, Vera Crux, and the Havanna, are the moſt conſiderable of all thoſe in America. The two firſt laſt as long as the flota and galleons continue in thoſe parts; and the laſt is opened as ſoon as the flota or galleons arrive there upon their return for Spain; this being the place where the two fleets join. See Flota, and Galleons.

The principal Britiſh fairs are, 1. Sturbridge-fair, near Cambridge, by far the greateſt in Britain, and perhaps in the world. 2. Briſtol has two fairs, very near as great as that of Sturbridge. 3. Exeter. 4. Weſt Cheſter. 5. Edinburgh. 6. Wheyhill; and, 7. Burford-fair; both for ſheep. 8. Pancras fair, in Staffordſhire, for ſaddle-horſes. 9. Bartholemew fair, at London, for lean and Welch black cattle. 10. St Faith's, in Norfolk, for Scotch runts. 11. Yarmouth fiſhing-fair for herrings, the only fiſhing fair in Great Britain. 12 Ipſwich butter-fair. 13. Woodborough-hill, in Dorſetſhire, for weſt-country manufactures, as kerſeys, druggits, &c. 14. Two cheeſe fairs at Chipping Norton: with innumerable other fairs, beſides weekly markets, for all ſorts of goods, as well our own as of foreign growth.

Fair, in ſea language, is uſed for the diſpoſition of the wind, when it is favourable to a ſhip's courſe, in oppoſition to that which is contrary or foul. The term *fair* is more comprehenſive than *large*, and includes about 16 or 18 points of the compaſs; whereas large is confined to the beam or quarter, that is, to a wind which croſſes the keel at right angles, or obliquely from the ſtern, but never to one right a-ſtern.

Fair (Iſle), a ſmall iſland lying between Orkney and Shetland, 12 or 10 leagues E. N. E. from the former; and ſeven, eight, or 10 leagues, S. W. from the latter. It is three miles long, and ſcarce half a mile broad, very craggy, with three high rocks which are viſible both from Orkney and Shetland. There is in this iſland a ſmall quantity of arable land, which is very fruitful and well manured; and there might be conſiderably more, but the inhabitants are obliged to reſerve it for peat and paſturage. They have for the ſize of the iſland a great many ſheep, and thoſe very good and fat: but they have no kind of moor-fowl or other game; but there is great plenty of ſea and water fowl, and all kinds of fiſh upon their coaſts. There is in effect no port, though they have two that are nominally ſo: one at the ſouth end, which is full of rocks, where only ſmall boats can lie, and that but indifferently; the other at the north-eaſt end, larger and ſafer in ſummer, ſo that it ſerves commodiouſly enough for

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Fair, Fairfax.

their fiſhery. The duke of Medina Sidonia, when commander of the famous Spaniſh armada in 1588, was wrecked on the eaſt coaſt of this iſland. The ſhip broke to pieces, but the duke and 200 men made their eſcape. They lived here ſo long, that both they and the inhabitants were almoſt famiſhed. At length the duke and the poor remains of his people were carried over to the main land of Shetland, and then to Dunkirk, by one Andrew Humphry, for which ſervice Andrew was rewarded with 3000 merks. This iſland produced to its former proprietor between 50l. and 60l. Sterling. It was ſold at Edinburgh, on the 20th of June 1766, for about 850l. to James Stewart of Burgh, Eſq.

Fair-Curve, is a winding line, uſed in delineating ſhips, whoſe ſhape is varied, according to the part of the ſhip which it is intended to deſcribe.

Fair-Way, in ſea language, the path or channel of a narrow bay, river, or haven, in which ſhips uſually advance in their paſſage up and down; ſo that if any veſſels are anchored therein, they are ſaid to lie in the fair-way.

FAIRFAX (Edward), natural ſon of Sir Thomas Fairfax, was an Engliſh poet who lived in the reigns of Elizabeth and James I. He wrote ſeveral poetical pieces, and was an accompliſhed genius. Dryden introduces Fairfax with Spencer, as the leading writers of the times; and even ſeems to give the preference to the former in the way of harmony, when he obſerves that Waller owned himſelf indebted for the harmony of his numbers to Fairfax's *Godfrey of Boulogne*. He died about the year 1632, at his own houſe called *Newhall*, in the pariſh of Fuyſton, between Denton and Knareſborough, and lies under a marble ſtone.

FAIRFAX (Sir Thomas), general of the parliamentary forces againſt Charles I. in 1644. See (*Hiſtory of*) BRITAIN, nº 127. *et ſeq.* He reſigned in 1650; after which he lived privately, till he was invited by general Monk to aſſiſt him againſt Lambert's army. He cheerfully embraced the occaſion; and, on the third of December 1659, appeared at the head of a body of gentlemen of Yorkſhire; when, upon the reputation of his name, a body of 12,000 men forſook Lambert and joined him. He was at the head of the committee appointed by the Houſe of Commons to attend king Charles II. at the Hague, to deſire him ſpeedily to return to England; and having readily aſſiſted in his reſtoration, returned again to his ſeat in the country; where he lived in a private manner till his death, which happened in 1671, in the 60th year of his age.—He wrote, ſays Mr Walpole, memorials of Thomas lord Fairfax, printed in 1699; and was not only an hiſtorian, but a poet. In Mr Thoreſby's muſeum were preſerved in manuſcript the following pieces: The Pſalms of David, the Canticles, the Songs of Moſes, and other parts of Scripture, verſified; a poem on Solitude; Notes of Sermons, by his lordſhip, by his lady daughter of Horace lord Vere, and by their daughter Mary the wife of George ſecond duke of Buckingham; and a Treatiſe on the Shortneſs of Life. But of all lord Fairfax's works, ſays Mr Walpole, the moſt remarkable were the verſes he wrote on the horſe on which Charles II. rode to his coronation, and which had been bred and preſented to the king by his lordſhip. How muſt that merry monarch, unapt to keep his countenance on more ſerious occaſions, have ſmiled at this aukward homage from the old victorious hero of republicaniſm and the covenant! He gave a collection of manuſcripts to the Bodleian library.

Fairford, Fairy.

FAIRFORD, a town in Glouceſterſhire, with a market on Thurſdays. It is remarkable for the church, which has curious painted glaſs-windows. They are ſaid to have been taken in a ſhip by John Tame, Eſq; towards the end of the 15th century, who built the church for their ſake. They are preſerved entire, and the figures are extremely well drawn and coloured. They repreſent the moſt remarkable hiſtories in the Old and New Teſtament. They are frequently viſited by travellers, and many go on purpoſe to view them, as one of the greateſt curioſities in England. The painter was Albert Durer. W. Long. 1. 46. N. Lat. 51. 42.

FAIRY, in ancient traditions and romances, ſignifies a ſort of deity, or imaginary genius, converſant on the earth, and diſtinguiſhed by a variety of fantaſtical actions either good or bad.

They were moſt uſually imagined to be women of an order ſuperior to human nature, yet ſubject to wants, paſſions, accidents, and even death; ſprightly and benevolent while young and handſome; moroſe, peeviſh, and malignant, if ugly, or in the decline of their beauty; fond of appearing in white, whence they are often called the *white ladies*.

Concerning theſe imaginary beings, no leſs a perſon than Jervaiſe of Tilleberry, marſhal of the kingdom of Arles, who lived in the beginning of the 13th century, writes thus in a work inſcribed to the emperor Otho IV. "It has been aſſerted by perſons of unexceptionable credit, that fairies uſed to chooſe themſelves gallants from among men, and rewarded their attachment with an affluence of wordly goods; but if they married, or boaſted of a fairy's favours, they as ſeverely ſmarted for ſuch indiſcretion." The like tales ſtill go current in Languedoc; and, throughout the whole province, there is not a village without ſome ancient ſeat or cavern which had the honour of being a fairy's reſidence, or at leaſt ſome ſpring where a fairy uſed to bathe. This idea of fairies has a near affinity with that of the Greeks and Romans, concerning the nymphs of the woods, mountains, and ſprings; and an ancient ſcholiaſt on Theocritus ſays, "The nymphs are demons which appear on the mountains in the figure of women:" and what is more ſurpriſing, the Arabs and other orientals have their *ginn* and *peri*, of whom they entertain the like notions.

But fairies have been likewiſe deſcribed as of either ſex, and generally as of minute ſtature, though capable of aſſuming various forms and dimenſions. The moſt charming repreſentation imaginable of theſe children of romantic fancy, is in the *Midſummer-night's Dream* of Shakeſpear; in referring to which, we will no doubt have been anticipated by the recollection of almoſt every reader.

Spenſer's Fairy Queen is an epic poem, under the perſons and characters of fairies. This ſort of poetry raiſes a pleaſing kind of horror in the mind of the reader, and amuſes his imagination with the ſtrangeneſs and novelty of the perſons who are repreſented in it; but, as a vehicle of inſtruction, the judicious object to it,

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Fairy, Faith.

it, as not having probability enough to make any moral impreſſion.

The belief of fairies ſtill ſubſiſts in many parts of our own country. The

"Swart fairy of the mine,"

(of German extraction), has ſcarce yet quitted our ſubterraneous works; (*vid.* next article.) *Puck*, or *Robin Good-Fellow*, ſtill haunts many of our villages. And in the highlands of Scotland, new-born children are watched till the chriſtening is over, leſt they ſhould be ſtolen or changed by ſome of theſe phantaſtical exiſtences.

Fairy of the Mine; an imaginary being, an inhabitant of mines. The Germans believed in two ſpecies; one fierce and malevolent; the other a gentle race, appearing like little old men dreſſed like the miners, and not much above two feet high. Theſe wander about the drifts and chambers of the works; ſeem perpetually employed, yet do nothing; ſome ſeem to cut the ore, or fling what is cut into veſſels, or turn the windlaſs; but never do any harm to the miners, unleſs provoked; as the ſenſible Agricola, in this point credulous, relates in his book *de Animantibus Subterraneis*.

Fairy Circle or *Ring*, a phenomenon pretty frequent in the fields, &c. ſuppoſed by the vulgar to be traced by the fairies in their dances. There are two kinds of it; one of about ſeven yards in diameter, containing a round bare path, a foot broad, with green graſs in the middle of it. The other is of different bigneſs, encompaſſed with a circumference of graſs. Meſſ. Jeſſop and Walker, in the Philoſophical Tranſactions, aſcribe them to lightning; which is thought to be confirmed by their being moſt frequently produced after ſtorms of that kind, as well as by the colour and brittleneſs of the graſs-roots when firſt obſerved. Lightning, like all other fires, moves round, and burns more in the extremity than in the middle: the ſecond circle ariſes from the firſt, the graſs burnt up growing very plentifully afterwards. Others maintain that theſe circles are made by ants, which are frequently found in great numbers therein.—Mr Cavallo, who hath publiſhed an eſteemed treatiſe on electricity, does not think that lightning is at all concerned in the formation of them: "They are not (ſays he) always of a circular figure; and, as I am informed, they ſeem to be rather beds of muſhrooms than the effects of lightning."

FAITH, in philoſophy and theology, that aſſent which we give to a propoſition advanced by another, the truth of which we do not immediately perceive from our own reaſon or experience; or it is a judgment or aſſent of the mind, the motive whereof is not any intrinſic evidence, but the authority or teſtimony of ſome other who reveals or relates it. Hence, as there are two kinds of authorities and teſtimonies, the one of God, and the other of man, faith becomes diſtinguiſhed into divine and human.

Divine Faith, is that founded on the authority of God; or it is that aſſent we give to what is revealed by God.

The objects of this faith, therefore, are matters of revelation. See Revelation and Religion.

Human Faith, is that whereby we believe what is told us by men. The object hereof is matter of human teſtimony and evidence. See Metaphysics.

Faith Fathorn.

Faith, in practical theology, makes the firſt of the theological virtues or graces.

Faith in God, in this ſenſe, denotes ſuch a conviction of his being, perfections, character, and government, as produces love, truſt, worſhip, obedience, and reſignation.

Faith in Chriſt, as it has been defined by ſome, is a mere aſſent to the goſpel as true; according to others, it ſignifies ſuch a perſuaſion that he is the Meſſiah, and ſuch a deſire and expectation of the bleſſings which he has promiſed in his goſpel to his ſincere diſciples, as engage the mind to fix its dependence upon him, and ſubject itſelf to him in all the ways of holy obedience. See Theology.

Faith, likewiſe, in reſpect to futurity, is a moral principle, implying ſuch a conviction of the reality and importance of a future ſtate, as is ſufficient to regulate the temper and conduct.

Faith, or *Fidelity*, (*Fides*), was deified by the ancient Romans, and had a temple in the Capitol conſecrated to her by Attilius Catalinus. Her prieſts wore white veils: unbloody ſacrifices were offered to her, and the greateſt oaths were taken in her name. Horace clothes her in white, places her in the retinue of Fortune, and makes her the ſiſter of Juſtice, *Od.* 24, 35. l. i. Public faith is repreſented in a great number of medals; ſometimes with a baſket of fruit in one hand, and ſome ears of corn in the other; and ſometimes holding a turtle-dove. But the moſt uſual ſymbol is two hands joined together. The inſcriptions are generally, *Fides Auguſti*, *Fides Exercitus*, or *Fides Militum*, &c.

FAITHFUL, an appellation aſſumed by the Mahometans. See Mahometans.

FAITHORN (William), an ingenious Engliſh artiſt, a native of London, was the diſciple of Peak the painter, and worked with him three or four years. At the breaking out of the civil war, Peak eſpouſed the cauſe of his ſovereign; and Faithorn, who accompanied his maſter, was taken priſoner by the rebels at Baringhouſe, from whence he was ſent to London, and confined in Alderſgate. In this uncomfortable ſituation he exerciſed his graver; and a ſmall head of the firſt Villars duke of Buckingham, in the ſtyle of Melan, is reckoned among his performances at that time. The ſolicitations of his friends in his favour at laſt prevailed; and he was releaſed from priſon, with permiſſion to retire to the continent. In France he found protection and encouragement from the Abbé de Marolles; and at this time it was that he formed an acquaintance with Nanteuil, from whoſe inſtructions he derived very conſiderable advantages. About the year 1650 he returned to England, and ſoon after married the ſiſter of a Captain Cround. By her he had two ſons; Henry, who was a bookſeller, and William an engraver in mezzotinto. Faithorn opened a ſhop near Temple-Bar, where he ſold not only his own engravings, but thoſe of other Engliſh artiſts, and imported a conſiderable number of prints from Holland, France, and Italy. About the year 1680, he retired from his ſhop, and reſided in Printing-Houſe Yard; but he ſtill continued to work for the booksellers, eſpecially Royſton, Martin, and Peake the younger, his former maſter's brother. He painted portraits from the life in crayons; which art

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Fakirs. he learned of Nanteuil during his abode in France. He alſo painted in miniature; and his performances in both theſe ſtyles were much eſteemed. His ſpirits were broken by the indiſcretion and diſſipation of his ſon William; and a lingering conſumption put an end to his life in 1691. He wrote a book *Upon Drawing, Graving, and Etching*, for which he was celebrated by his friend Thomas Flatman the poet.

FAKIRS, Indian monks or friars. They out-do the ſeverity and mortification of the ancient Anchorets or Solitaries. Some of them make a vow of continuing all their lifetime in one poſture, and keep it effectually. Others never lie down; but continue in a ſtanding poſture all their lives, ſupported only by a ſtick, or rope under their arm-pits. Some mangle their bodies with ſcourges and knives. They look upon themſelves to have conquered every paſſion, and triumphed over the world; and accordingly ſcruple not, as if in a ſtate of innocence, to appear entirely naked in public.

The common people of Eaſt India are thoroughly perſuaded of the virtue and innocence of the fakirs; notwithſtanding which, they are accuſed of committing the moſt enormous crimes in private.

They have alſo another kind of fakirs, who do not practiſe ſuch ſeverities: theſe flock together in companies, and go from village to village, propheſying, and telling fortunes. They are wicked villains, and it is dangerous for a man to meet them in a lone place: nevertheleſs the Indian idolaters have them in the utmoſt veneration. They make uſe of drums, trumpets, and other muſical inſtruments, to rouſe their ſouls, and work themſelves up to an artificial ecſtaſy, the better to publiſh their pretended prophecies.

Some of the votaries of theſe ſages moſt devoutly kiſs their privy parts; and they receive this monſtrous declaration of reſpect with a kind of ecſtatic pleaſure. The moſt ſober and diſcreet Indians conſult them in this prepoſterous attitude; and their female votaries converſe with them a conſiderable time with the moſt indecent freedom.

The fire they burn is made of cow's dung, dried in the ſun. When they are diſpoſed to ſleep, they repoſe themſelves on cow's dung, and ſometimes on ordure itſelf. They are ſo indulgent towards every living creature, that they ſuffer themſelves to be over-run with vermin, or ſtung by inſects, without the leaſt reluctancy or complaint.

It is more than probable, theſe Indian friars have ſome ſecret art to lull their ſenſes aſleep, in order to render themſelves in a great meaſure inſenſible of the exceſſive torments they voluntarily undergo. Ovington aſſures us, that "as he was one day in an aſſembly of fakirs, he obſerved, that they drank opiates infuſed in water; the intoxicating virtue whereof was enough to turn their brain."

The garment of the chief fakirs conſiſts of three or four yards of orange-coloured linen, which they tie round them, and a tyger's ſkin, which hangs over their ſhoulders. Their hair is woven in treſſes, and forms a kind of turban. The ſuperior of the fakirs is diſtinguiſhed from the reſt by having a greater number of pieces in his garment, and by a chain of iron, two yards long, tied to his leg. When he deſigns to reſt in any place, a garment is ſpread upon the ground; on which he ſits and gives audience, whilſt his diſciples publiſh his virtues. Falaſha.

Some perſons of quality in India have become fakirs: among others, five great lords belonging to the court of Cha-gehan, Mogul of the Indies. It is ſaid, there are about two millions of fakirs in the Eaſt Indies.

FALASHA, a people of Abyſſinia, of Jewiſh origin, deſcribed by Mr Bruce, who was at great pains to acquaint himſelf with their hiſtory by cultivating the friendſhip of the moſt learned perſons among them he could meet with.

According to the accounts received from them, the Falaſha are the deſcendants of thoſe Jews who came from Paleſtine into Ethiopia, as attendants of Menilek the ſon of the queen of Sheba or Saba by Solomon. They agree in the relations given by the Abyſſinians of that princeſs, which are mentioned under the article ETHIOPIA; but deny that the poſterity of thoſe who came with Menilek ever embraced the Chriſtian religion, as the Abyſſinians ſay they did. They ſay, that at the decline of the Jewiſh commerce, when the ports of the Red Sea fell into the hands of other nations, and no intercourſe took place betwixt them and Jeruſalem, the Jewiſh inhabitants quitted the ſea-coaſts and retired into the province of Dembea. While they remained in the cities on the Red Sea, they exerciſed the trades of brick and tile making, pottery, thatching houſes, &c. and after leaving the ſea-coaſts, they choſe the country of Dembea on account of the plenty of materials it afforded for exerciſing the trades they profeſſed. Here they carried the art of pottery to a great degree of perfection, multiplied exceedingly, and became very numerous and powerful about the time that the Abyſſinians were converted to Chriſtianity. As this event was accounted by them an apoſtacy from the true religion, they now ſeparated themſelves from the Abyſſinians, and declared one Phineas, of the line of Solomon, their king. Thus they ſay, they have ſtill a prince of the houſe of Judah for their ſovereign, though their aſſertion is treated with contempt, and a nick-name beſtowed on the Falaſhan family by the other Abyſſinians. About the year 960, the queen of this people, after extirpating the Abyſſinian princes on the rock Damo, aſſumed the ſovereignty of the whole empire, which they retained for ſome time, as is related under the article ETHIOPIA; but their power being by degrees reduced, they were obliged to take up their reſidence among the rugged mountains of Samen; one of which they choſe for their capital, and which has ever ſince been called the *Jews Rock*. About the year 1600, they were almoſt entirely ruined by an overthrow from the Abyſſinians, in which both their king and queen were ſlain; ſince which time they have been in ſubjection to the emperors of that country, but are ſtill governed by their own princes. When Mr Bruce was in Abyſſinia they were ſuppoſed to amount to about 100,000 effective men. Gideon and Judith were the names of the king and queen at that time; and theſe, according to our author, ſeem to be preferred to others for the royal family.

The language of this people is very different from the Hebrew, Samaritan, or any other which the Jews ever ſpoke in their own country. On being interro-

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Falaſha ‖ Falco

gated concerning it by Mr Bruce, they ſaid, that it was probably one of thoſe ſpoken by the nations on the Red Sea, among whom they had ſettled at their firſt coming. They arrived in Abyſſinia ſpeaking Hebrew, and with the advantage of having books in that language; but had now forgot it, which indeed is not to be wondered at, as they had loſt their Hebrew books, and were entirely ignorant of the art of writing. At the time of their leaving Jeruſalem, they were in poſſeſſion both of the Hebrew and Samaritan copies of the law; but when their fleet was deſtroyed in the time of Rehoboam, and no farther communication with Jeruſalem took place, they were obliged to uſe tranſlations of the ſcriptures, or thoſe copies which were in poſſeſſion of the ſhepherds, who, they ſay, were all Jews before the time of Solomon. On being aſked, however, where the Shepherds got their copy, and being told, that, notwithſtanding the invaſion of Egypt by Nebuchadnezzar, there was ſtill a communication with Jeruſalem by means of the Iſhmaelite Arabs through Arabia, they frankly acknowledged that they could not tell; neither had they any memorials of the hiſtory either of their own or any other country; all that they believed in this caſe being derived from mere tradition, their hiſtories, if any exiſted, having been deſtroyed by the famous Mooriſh Captain Gragné, of whom an account is given under the article ETHIOPIA. They ſay, that the firſt book of Scripture they ever received was that of Enoch; and they place that of Job immediately after it, ſuppoſing that patriarch to have lived ſoon after the flood. They have no copy of the Old Teſtament in the Falaſha language, what they make uſe of being in that of Geez. This is ſold to them by the Abyſſinian Chriſtians, who are the only ſcribes in that country. No difference takes place about corruptions of the text; nor do the Falaſha know any thing of the Jewiſh Talmud, Targum, or Cabala.

FALCADE, in the manege, the motion of a horſe when he throws himſelf upon his haunches two or three times, as in very quick curvets; which is done in forming a ſtop and half ſtop. See STOP.

FALCATED, ſomething in the form of a ſickle: thus, the moon is ſaid to be *falcated* when ſhe appears horned.

FALCO, in ornithology, a genus belonging to the order of accipitres, the characters of which are theſe: The beak is crooked, and furniſhed with wax at the baſe: the head is thick-ſet with feathers, and the tongue is cloven. The eagle and hawk form this genus.

Plate CXC. 1. The leucocephalus bald, or white-headed eagle of Cateſby, is aſh-coloured, with the head and tail white; the iris of the eye is white, over which is a prominence covered with a yellow ſkin; the bill and the cere or wax are yellow, as are likewiſe the legs and feet; and the talons are black. Though it is an eagle of ſmall ſize, it weighs nine pounds, is ſtrong and full of ſpirit, preying on lambs, pigs, and fawns. They always make their neſts near the ſea or great rivers, and uſually upon old dead pine or cypreſs trees, continuing to build annually on the ſame tree till it falls. Though he is ſo formidable to all birds, yet he ſuffers them to build near his royal neſt without moleſtation; particularly the fiſhing hawk, herons, &c. which all build on high trees, and in ſome places are ſo near one another, that they appear like a rookery. The neſts are very large and very fetid by reaſon of the relicts of their prey. Lawſon ſays they breed very often, laying again under their callow young; whoſe warmth hatches the eggs. In Bering's Iſle they make their neſts on the cliffs near ſix feet wide and one thick; and lay two eggs in the beginning of July. This ſpecies inhabits both Europe and America; but is more common in the latter. Beſides fleſh, it feeds alſo on fiſh. This, however, it does not procure for itſelf; but ſitting in a convenient ſpot, watches the diving of the oſprey into the water after a fiſh, which the moment it has ſeized the bald eagle follows cloſe after, when the oſprey is glad to eſcape by dropping the fiſh from his bill; and ſuch is the dexterity of the former, that it often ſeizes the prey before it can fall to the ground. Cateſby ſays the male and female are much alike. Falco.

2. The offifragus, or ſea-eagle, with yellow wax, and half-feathered legs; it is about the ſize of a peacock; the feathers are white at the baſe, iron-coloured in the middle, and black at the points; and the legs are yellow. It is found in ſeveral parts of Great Britain and Ireland. Mr Willoughby tells us, that there was an aëry of them in Whinfield Park, Weſtmoreland; and the bird ſoaring in the air with a cat in its talons (which Barlow drew from the very fact which he ſaw in Scotland), is of this kind. The cat's reſiſtance brought both animals to the ground, when Barlow took them up; and afterwards cauſed the event to be engraved in the 36th plate of his Collection of Prints. Turner ſays, that in his days this bird was too well known in England; for it made horrible deſtruction among the fiſh. All authors indeed agree, that it feeds principally on fiſh, which it takes as they are ſwimming near the ſurface, by darting itſelf down upon them; not by diving or ſwimming, as ſome authors have pretended, who furniſh it for that purpoſe with one webbed foot to ſwim with, and another divided foot to take its prey with. Martin, ſpeaking of what he calls the great eagles of the Weſtern Iſles, ſays, that they faſten their talons in the back of the fiſh, commonly of ſalmon, which are often above the water, or very near the ſurface. Thoſe of Greenland will even take a young ſeal out of the water. Turner, above mentioned, ſays, that the fiſhermen were fond of anointing their baits with the fat of this bird, imagining that it had a peculiar alluring quality: they were even ſuperſtitious enough to believe, that whenever the ſea-eagle hovered over a piece of water, the fiſh (as if charmed) would riſe to the ſurface with their bellies upwards; and in that manner preſent themſelves to him. It alſo preys on water fowl. This ſpecies is alſo frequent in North America, and was alſo met with in Botany Iſland by Captain Cooke.

3. The chryſaëtos, or golden eagle, weighs about 12 pounds, and is in length about three feet, the wings when extended meaſuring about ſeven feet four inches. The ſight and ſenſe of ſmelling are very acute: the head and neck are clothed with narrow, ſharp-pointed feathers, of a deep brown colour bordered with tawney; the hind part of the head in particular is of a bright ruſt colour. Theſe birds are very deſtructive to fawns, lambs, kids, and all kinds of game; particularly in the breeding ſeaſon, when they bring a vaſt quan-

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Falco. tity of prey to their young. Smith, in his Hiſtory of Kerry, relates, that a poor man in that country got a comfortable ſubſiſtence for his family, during a ſummer of famine, out of an eagle's neſt, by robbing the eaglets of the food the old ones brought; whoſe attendance he protracted beyond the natural time, by clipping the wings and retarding the flight of the former. It is very unſafe to leave infants in places where eagles frequent; there being inſtances in Scotland of two being carried off by them; but, fortunately, the theft was diſcovered in time, and the children were reſtored unhurt out of the eagles neſts. In order to extirpate theſe pernicious birds, there is a law in the Orkney iſles, which intitles every perſon that kills an eagle to a hen out of every houſe in the pariſh where it was killed. Eagles ſeem to give the preference to the carcaſes of dogs and cats. People who make it their buſineſs to kill thoſe birds, lay one or other of theſe carcaſes by way of bait; and then conceal themſelves within gunſhot. They fire the inſtant the eagle alights; for ſhe, that moment, looks about before ſhe begins to prey. Yet, quick as her ſight may be, her ſenſe of hearing ſeems ſtill more exquiſite. If hooded crows or ravens happen to be nearer the carrion, and reſort to it firſt, and give a ſingle croak, the eagle is certain of inſtantly repairing to the ſpot.

Eagles are remarkable for their longevity, and for their power of ſuſtaining a long abſtinence from food. Mr Keyſler relates, that an eagle died at Vienna after a confinement of 104 years. This pre-eminent length of days probably gave occaſion to the ſaying of the Pſalmiſt, "Thy youth is renewed like the eagle's." One of this ſpecies, which was nine years in the poſſeſſion of Owen Holland, Eſq; of Conway, lived 32 years with the gentleman who made him a preſent of it; but what its age was when the latter received it from Ireland is unknown. The ſame bird alſo furniſhes us with a proof of the truth of the other remark; having once, through the neglect of ſervants, endured hunger for 21 days without any ſuſtenance whatever.

4. The fulvus, or white-tailed eagle of Edwards, has the whole plumage of a duſky brown: the breaſt marked with triangular ſpots of white, but which are wanting in the Britiſh kind: the tail is white, tipt with black; but in young birds duſky, blotched with white: the legs are covered to the toes with ſoft ruſt-coloured feathers. Theſe birds inhabit Hudſon's Bay and northern Europe as far as Drontheim. They are found on the higheſt rocks of the Uralian chain, where it is not covered with wood; but are moſt frequent on the Siberian, where they make their neſt on the loftieſt rocks. They are rather inferior in ſize to the ſea-eagle; but are generous, ſpirited, and docile. The independent Tartars train them for the chaſe of hares, foxes, antelopes, and even wolves. The uſe is of conſiderable antiquity; for Marco Polo, the great traveller of 1269, obſerved and admired the diverſion of the great cham of Tartary; who had ſeveral eagles, which were applied to the ſame purpoſes as they are at preſent. The Tartars alſo eſteem the feathers of the tail as the beſt they have for pluming their arrows. This ſpecies is frequent in Scotland; where it is called the *black eagle*, from the dark colour of its plumage. It is very deſtructive to deer, which it will ſeize between the horns; and by inceſſantly beating it about the eyes with its wings, ſoon makes a prey of the harraſſed animal. The eagles in the iſle of Rum have nearly extirpated the ſtags that uſed to abound there. They generally build in clefts of rocks near the deer-foreſts; and make great havoc not only among them, but alſo among the white hares and ptarmigans. Mr Willoughby gives the following curious account of the neſt of this ſpecies. "In the year of our Lord 1668, in the woodlands near the river Darwent, in the peak of Derbyſhire, was found an eagle's neſt made of great ſticks, reſting one end on the edge of a rock, the other on two birch trees; upon which was a layer of ruſhes, and over them a layer of heath, and upon the heath ruſhes again; upon which lay one young one and an addle egg; and by them a lamb, a hare, and three heath poults. The neſt was about two yards ſquare, and had no hollow in it. The young eagle was black as a hobby, of the ſhape of a goſhawk, almoſt of the weight of a gooſe, rough-footed, or feathered down to the foot: having a white ring about the tail." Falco.

5. The cyaneus, or hen-harrier, with white wax, yellow legs, a whitiſh blue body, and a white ring round the eyes and throat. It is the blue hawk of Edwards, and is a native of Europe and Africa. Theſe birds are extremely deſtructive to young poultry and to the feathered game: they fly near the ground, ſkimming the ſurface in ſearch of prey. They breed on the ground, and never are obſerved to ſettle on trees.

6. The albicilla, or cinereous eagle, is inferior in ſize to the golden eagle; the head and neck are of a pale aſh-colour; the body and wings cinereous, clouded with brown; the quill-feathers very dark; the tail white; the legs feathered but little below the knees, and of a very bright yellow. The male is of a darker colour than the female. The bill of this ſpecies is rather ſtraighter than is uſual in the eagle; which ſeems to have induced Linnæus to place it among the *vultures*. But Mr Pennant obſerves, that it can have no title to be ranked with that genus, the characteriſtical mark of which is, that the head and neck are either quite bare, or only covered with down; whereas this bird is wholly feathered. This ſpecies is in ſize equal to the black eagle, and inhabits Europe as high as Iceland and Lapmark. It is common in Greenland, but does not extend to America; or, according to Mr Pennant, if it does, it varies into the white-headed eagle, to which it has great affinity, particularly in its feeding much on fiſh; the Danes therefore call it *Fiſke-orn*. It is common in the ſouth of Ruſſia, and about the Volga, as far as trees will grow; but is very ſcarce in Siberia. It inhabits Greenland the whole year, ſitting on the rocks with flagging wing, and flies ſlowly. It makes its neſt on the lofty cliffs, with twigs, lining the middle with moſſes and feathers; lays two eggs; and ſits in the latter end of May or beginning of June. Theſe birds prey on young ſeals, which they ſeize as they are floating on the water; but oftentimes, by fixing their talons in an old one, they are overmatched, and drawn down to the bottom, ſcreaming horribly. They feed alſo on fiſh, eſpecially the lumpfiſh, and a ſort of trout; on ptarmigans, auks, and eider-ducks. They ſit on the top of rocks, attentive to the motion of the diving birds; and with quick eyes obſerve their courſe by the bubbles which riſe to the ſurface of the water, and catch the fowls as they riſe for

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Falco. for breath. The Greenlanders uſe their ſkins for cloathing next to their bodies; eat the fleſh; and keep the bill and feet for amulets. They kill them with the bow; or take them in nets placed in the ſnow properly baited; or tempt them by the fat of ſeals, which the eagles eat to an exceſs; which occaſions ſuch a torpidity as to make them an eaſy prey. They are common in Scotland and the Orkneys; where they feed on fiſh, as well as on land animals.

7. The crying eagle (Arct. Zool. p. 215.), with a duſky bill and yellow cere; the colour of the plumage is a ferruginous brown; the coverts of the wings and ſcapulars are elegantly varied with oval white ſpots; the primaries duſky, the ends of the greater white; the breaſt and belly are of a deeper colour than the reſt of the plumage, ſtreaked downwards with dull yellow; the tail is dark brown, tipt with dirty white; the legs are feathered to the feet, which are yellow. The length of the bird is two feet.—This ſpecies is found in many parts of Europe, but not in Scandinavia; is frequent in Ruſſia and Siberia; and extends even to Kamtſchatka. It is leſs generous and ſpirited than other eagles, and is perpetually making a plaintive noiſe; from which it was ſtyled by the ancients *planga & clanga**; and *anataria*, from its preying on ducks, which Pliny† deſcribes with great elegance. The Arabs uſed to train it for the chace; but its quarry was cranes and other birds; the more generous eagle being flown at antelopes and various quadrupeds. This ſpecies was itſelf an object of diverſion, and made the game of even ſo ſmall a falcon as the ſparrow hawk; which would purſue it with great eagerneſs, ſoar above, then fall on it, and faſtening with its talons, keep beating it about the head with its wings, till they both fell together to the ground. This Sir John Chardin has ſeen practiſed about Tauris.

* *Ariſt. Hiſt. an. lib. 9*

† *Lib. x. c. 3.*

8. The milvus, or kite, is a native of Europe, Aſia, and Africa. This ſpecies generally breeds in large foreſts or woody mountainous countries. Its neſt is compoſed of ſticks, lined with ſeveral odd materials, ſuch as rags, bits of flannel, rope, and paper. It lays two, or at moſt three, eggs; which, like thoſe of other birds of prey, are much rounded and blunt at the ſmaller end. They are white, ſpotted with dirty yellow. Its motion in the air diſtinguiſhes it from all other birds, being ſo ſmooth and even that it is ſcarce perceptible. Sometimes it will remain quite motionleſs for a conſiderable ſpace; at others glide through the ſky without the leaſt apparent action of its wings; from thence deriving the old name of *glead* or *glede*, from the Saxon *glida*. They inhabit the north of Europe, as high as Jarlſberg, in the very ſouth of Norway; but do not extend farther. They quit Sweden in flocks at the approach of winter, and return in ſpring. Some of them winter about Aſtrakan, in lat. 46. 30: but the far greater part are ſuppoſed to retire into Egypt, being ſeen in September paſſing by Conſtantinople in their way from the north; and again in April returning to Europe, to ſhun the great heats of the eaſt. They are obſerved in vaſt numbers about Cairo, where they are extremely tame, and feed even on dates, probably for want of other food. They alſo breed there; ſo that, contrary to the nature of other rapacious birds, they increaſe and multiply twice in the year; once in the mild winters of Egypt, and a ſecond time in the ſummers of the north. It makes its appearance in Greece in the ſpring; and in the early ages, ſays Ariſtophanes, "it governed that country; and men fell on their knees when they were firſt bleſſed with the ſight of it, becauſe it pronounced the flight of winter, and told them to begin to ſhear their vernal fleeces." In Britain they are found the whole year. Lord Bacon obſerves, that when kites fly high, it portends fair and dry weather. Falco.

9. The gentilis, or gentil falcon, inhabits the north of Scotland, and was in high eſteem as a bold and ſpirited bird in the days of falconry. It makes its neſt in rocks: it is larger than the goſhawk; the head of a light ruſt colour, with oblong black ſpots; the whole under ſide from chin to tail white, tinged with yellow; the back of a brown colour; the tail barred with four or five bars of black, and as many of aſh-colour; the very tips of all the tail-feathers white.

10. The ſubbuteo, or hobby, was uſed like the keſtrel in the humbler kind of falconry; particularly in what was called *daring of larks*: the hawk was caſt off; the larks, aware of their moſt inveterate enemy, were fixed to the ground for fear; by which means they became a ready prey to the fowler, by drawing a net over them. The back of this bird is brown; the nape of the neck white; and the belly pale, with oblong brown ſpots. It is a bird of paſſage; but breeds in Britain, and migrates in October.

11. The buteo, or buzzard, is the moſt common of the hawk kind in England. It breeds in large woods; and uſually builds on an old crow's neſt, which it enlarges, and lines with wool and other ſoft materials. It lays two or three eggs, which are ſometimes perfectly white, ſometimes ſpotted with yellow. The cock buzzard will hatch and bring up the young if the hen is killed. The young keep company with the old ones for ſome little time after they quit the neſt; which is not uſual with other birds of prey, who always drive away their brood as ſoon as they can fly. This ſpecies is very ſluggiſh and inactive, and is much leſs in motion than other hawks; remaining perched on the ſame bough for the greateſt part of the day, and is found at moſt times near the ſame place. It feeds on birds, rabbits, moles, and mice; it will alſo eat frogs, earthworms, and inſects. This bird is ſubject to ſome variety in its colour. Some have their breaſt and belly of a brown colour, and are only marked croſs the craw with a large white creſcent; but uſually the breaſt is of a yellowiſh white, ſpotted with oblong ruſt-coloured ſpots, pointing downwards: the back of the head, neck, and coverts of the wings, are of a deep brown, edged with a pale ruſt-colour: the middle of the back covered only with a thick white down. The tail is barred with black, and aſh-colour, and ſometimes with ferruginous.

12. The tinnunculus, or keſtrel, breeds in the hollows of trees, in the holes of high rocks, towers, and ruined buildings. It feeds on field-mice, ſmall birds, and inſects; which it will diſcover at a great diſtance. This is the hawk that we ſo frequently ſee in the air fixed in one place; and, as it were, fanning it with its wings; at which time it is watching for its prey. When falconry was in uſe in Great Britain, this bird was trained for catching ſmall birds and young partridges. It is eaſily diſtinguiſhed from all other hawks.

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Falco. by its colours. The crown of the head and the greater part of the tail are of a fine light grey; the back and coverts of the wing of a brick-red, elegantly ſpotted with black: the whole under ſide of the bird of a pale ruſt-colour ſpotted with black.

13. The ſufflator, with yellowiſh wax and legs; the body is of a browniſh white colour; and the covers of the eyes are bony. He has a fleſhy lobe between the noſtrils; which when angry or terrified, he inflates till his head becomes as big as his whole body. He is a native of Surinam.

14. The cachinnans, or laughing hawk, has yellowiſh legs and wax, and white eye-brows; the body is variegated with brown and white; and it has a black ring round the top of the head. It makes a laughing kind of noiſe when it obſerves any perſon, and is a native of America.

15. The columbarius, or pigeon-hawk of Cateſby, weighs about ſix ounces. The bill is black at the point, and whitiſh at the baſe; the iris of the eye is yellow; the baſe of the upper mandible is covered with a yellow cere or wax; all the upper part of the body, wings, and tail, are brown. The interior vanes of the quill-feathers have large red ſpots. The tail is marked with large regular tranſverſe white lines; the throat, breaſt, and belly, are white, mixed with brown; the ſmall feathers that cover the thighs reach within half an inch of the feet, and are white, with a tincture of red, beſet with long ſpots of brown; the legs and feet are yellow. It inhabits America, from Hudſon's Bay as low as South Carolina. In the laſt it attains to a larger ſize. In Hudſon's Bay it appears in May on the banks of Severn river, breeds, and retires ſouth in autumn. It feeds on ſmall birds; and on the approach of any perſon, flies in circles, and makes a great ſhrieking. It forms its neſt in a rock, or ſome hollow tree, with ſticks and graſs; and lines it with feathers: and lays from two to four eggs, white, ſpotted with red. In Carolina it preys on pigeons, and young of the wild turkies.

16. The furcatus, or ſwallow-tailed hawk, has a black bill, leſs hooked than uſual with rapacious birds: the eyes are large and black, with a red iris: the head, neck, breaſt, and belly, are white; the upper part of the back and wings a dark purple; but more duſky towards the lower parts, with a tincture of green. The wings are long in proportion to the body, and, when extended, meaſure four feet. The tail is dark purple mixed with green, and remarkably forked. This moſt elegant ſpecies inhabits only the ſouthern parts of North America; and that only during ſummer. Like ſwallows, they feed chiefly flying; for they are much on wing, and prey on various ſorts of inſects. They alſo feed on lizards and ſerpents; and will kill the largeſt of the regions it frequents with the utmoſt eaſe. They quit North America before winter, and are ſuppoſed to retreat to Peru.

17. Haliætus, the fiſhing-hawk of Cateſby, or the oſprey, weighs three pounds and a quarter; it meaſures, from one end of the wing to the other, five feet and a half. The bill is black, with a blue cere or wax; the iris of the eye is yellow, and the crown of the head brown, with a mixture of white feathers; from each eye, backwards, runs a brown ſtripe: the back, wings, and tail, are of a dark brown; the throat, neck, and belly, white; the legs and feet are rough and ſcaly, and of a pale blue colour; the talons are black, and nearly of an equal ſize; the feathers of the thighs are ſhort, and adhere cloſe to them, contrary to others of the hawk kind, which nature ſeems to have deſigned for the more eaſily penetrating the water. Notwithſtanding the oſprey is ſo perſecuted by the bald eagle, yet it always keeps near its haunts. It is a ſpecies of vaſt quickneſs of ſight; and will ſee a fiſh near the ſurface from a great diſtance: deſcend with prodigious rapidity, and carry the prey with an exulting ſcream high into the air. The eagle hears the note, and inſtantly attacks the oſprey; who drops the fiſh, which the former catches before it can reach the ground or water. The lower parts of the rivers and creeks near the ſea in America, abound with theſe eagles and hawks, where ſuch diverting conteſts are often ſeen. It ſometimes happens that the oſprey periſhes in taking its prey; for if it chances to fix its talons in an over-grown fiſh, it is drawn under water before it can diſengage itſelf, and is drowned. Falco.

18. The Iceland falcon (G. Mag. 1771, p. 297), or gyrfalco *Lin.* has a ſtrong bill, much hooked, the upper mandible ſharply angulated on the lower edges, with a bluiſh wax: the head is of a very pale ruſt-colour, ſtreaked downwards with duſky lines: the neck, breaſt, and belly, are white, marked with cordated ſpots; the thighs white, croſſed with ſhort bars of deep brown: the back and coverts of the wings are duſky, ſpotted and edged with white; the exterior webs of the primaries duſky mottled with reddiſh white, the inner barred with white: the feathers of the tail are croſſed with 14 or more narrow bars of duſky and white; the duſky bars regularly oppoſing thoſe of white: the wings, when cloſed, reach almoſt to the end of the train: legs are ſtrong and yellow. The length of the wing, from the pinion to the tip is 16 inches.—This ſpecies is an inhabitant of Iceland, and is the moſt eſteemed of any for the ſport of falconry.

19. The fuſcus, or Greenland falcon, has duſky irides; lead-coloured wax and feet; brown crown, marked with irregular oblong white ſpots; whitiſh forehead, blackiſh cheeks; the hind part of the head and throat white; breaſt and belly of a yellowiſh white, ſtriped downwards with duſky ſtreaks; the back duſky, tinged with blue, the ends of the feathers lighteſt, and ſprinkled over with a few white ſpots, eſpecially towards the rump; the wings of the ſame colours, variegated beneath with white and black; the upper part of the tail duſky croſſed very faintly with paler bars, the under ſide whitiſh. It inhabits all parts of Greenland, from the remoteſt hills to thoſe which impend over the ſea. They are even ſeen on the iſlands of ice remote from ſhore. They retire in the breeding-ſeaſon to the fartheſt part of the country, and return in autumn with their young. They breed in the ſame manner as the cinereous eagle, but in more diſtant places; and lay from three to five eggs. The tail of the young is black, with great brown ſpots on the exterior webs. They prey on ptarmigans, auks, and all the ſmall birds of the country. They have frequent diſputes with the raven, but ſeldom come off victors;

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Falco. for the raven will, on being attacked, fling itſelf on its back; and either by defending itſelf with its claws, or by calling, with its croaking, numbers of others to its help, oblige the falcon to retire. The Greenlanders uſe the ſkin, among others, for their inner garments; the wings for bruſhes; the feet for amulets: but ſeldom eat the fleſh, unleſs compelled by hunger.

20. The gyrfalcon (Br. Zool. n° 47.) has a yellow wax; the bill bluiſh, and greatly hooked; the eye dark blue; the throat of a pure white: the whole body, wings, and tail, of the ſame colour, moſt elegantly marked with duſky bars, lines, or ſpots, leaving the white the far prevailing colour. There are inſtances, but rare, of its being found entirely white. In ſome, the whole tail is croſſed by remote bars of black or brown; in others, they appear only very faintly on the middle feathers: the feathers of the thighs are very long and unſpotted: the legs ſtrong, and of a light blue. Its weight is 45 ounces Troy; length, near two feet; extent, four feet two. This ſpecies has the ſame manners and haunts with the former. It is very frequent in Iceland; is found in Lapmark and Norway; and rarely in the Orknies and North Britain. In Aſia, it dwells in the higheſt points of the Urallian and other Siberian mountains, and dares the coldeſt climates throughout the year It is kept in the latitude of Peterſburg, uninjured in the open air during the ſevereſt winters.—This ſpecies is pre-eminent in courage as well as beauty, and is the terror of other hawks. It was flown at all kinds of fowl, how great ſoever they were; but its chief game uſed to be herons and cranes.

The three laſt ſpecies are in high eſteem for ſport. They are reſerved for the kings of Denmark; who ſend their falconer with two attendants annually into Iceland to purchaſe them. They are caught by the natives; a certain number of whom in every diſtrict are licenſed for that purpoſe. They bring all they take, about midſummer, to Beſſeſted, to meet the royal falconer; and each brings 10 or 12, capped, and perched on a croſs pole, which they carry on horſeback and reſt on the ſtirrup. The falconer examines the birds, rejects thoſe which are not for his purpoſe, and gives the ſeller a written certificate of the qualities of each, which intitles him to receive from the king's receiver-general ſeventeen rixdollers for the pureſt white falcon (n° 20.), ten for n° 19. or thoſe which are leaſt white; and ſeven for n° 18. This brings into the iſland between 2000 and 3000 rixdollars annually. They are taken in the following manner:—Two poſts are faſtened in the ground, not remote from their haunts. To one is tied a ptarmigan, a pigeon, a cock or hen, faſtened to a cord that it may have means of fluttering, and ſo attract the attention of the falcon. On the other poſt is placed a net, diſtended on a hoop, about ſix feet in diameter. Through this poſt is introduced a ſtring, above 100 yards long, which is faſtened to the net, in order to pull it down; and another is faſtened to the upper part of the hoop, and goes through the poſt to which the bait is tied. As ſoon as the falcon ſees the fowl flutter on the ground, he takes a few circles in the air, to ſee if there is any danger, then darts on its prey with ſuch violence as to ſtrike off the head, as nicely as if it was done with a razor. He then uſually riſes again, and takes another circle, to explore the place a ſecond time: after which it makes another ſtoop; when, at the inſtant of its deſcending, the man pulls the dead bird under the net; and, by means of the other cord, covers the falcon with the net at the moment it has ſeized the prey; the perſon lying concealed behind ſome ſtones, or elſe lies flat on his belly, to elude the ſight of the falcon. As ſoon as one is caught, it is taken gently out of the net, for fear of breaking any of the feathers of the wings or tail; and a cap is placed over its eyes. If any of the tail-feathers are injured, the falconers have the art of grafting others; which ſometimes has occaſioned a needleſs multiplication of ſpecies. Falco.

The Iceland falcons are in the higheſt eſteem. They will laſt 10 or 12 years; whereas thoſe of Norway, and other countries, ſeldom are fit for ſport after two or three years uſe. Yet the Norwegian hawks were in old times in great repute in this kingdom, and even thought bribes worthy of a king. Geoffry Le Pierre, chief juſticiary, gave two good Norway hawks to King John, that Walter Le Madina might have leave to export 100 weight of cheeſe. John the ſon of Ordgar, gave a Norway hawk to have the king's requeſt to the king of Norway, to let him have his brother's chattels; and Ralf Havoc fined to King Stephen in two girfals (gyrfalcons) and two Norway hawks, that he might have the ſame acquittance that his father had.

21. The aviporus, with black wax, yellow legs, half naked, the head of an aſh colour, and having an aſh-coloured ſtripe on the tail, which is white at the end. It is the honey-buzzard of Ray, and had its name from the combs of waſps being found in its neſt. It is a native of Europe, and feeds on mice, lizards, frogs, bees, &c. It runs very ſwiftly, like a hen.

22. The æruginoſus, or moor-buzzard, with greeniſh wax, a greyiſh body, the top of the head, nape of the neck, and legs, yellowiſh; is a native of Europe, and frequents moors, marſhy places, and heaths: it never ſoars like other hawks; but commonly ſits on the ground or on ſmall buſhes. It makes its neſt in the midſt of a tuft of graſs or ruſhes. It is a very fierce and voracious bird; and is a great deſtroyer of rabbits, young wild-ducks, and other water-fowl. It preys, like the oſprey, on fiſh.

23. The palumbarius, with black wax edged with yellow; yellow legs, a brown body, the prime feathers of the tail marked with pale ſtreaks, and the eye-brows white. It is the goſhawk of Ray; and was formerly in high eſteem among falconers, being flown at cranes, geeſe, pheaſants, and partridges. It breeds in Scotland, and builds its neſt in trees. It is very deſtructive to game, and daſhes through the woods after its quarry with vaſt impetuoſity; but if it cannot catch the object of its purſuit almoſt immediately, deſiſts, and perches on a bough till ſome new game preſents itſelf.—This ſpecies is common in Muſcovy and Siberia. They extend to the river Amur; and are uſed by the emperor of China in his ſporting progreſſes, attended by his grand falconer, and 1000 of the ſubordinate. Every bird has a ſilver plate faſtened to its foot, with the name of the falconer who had the charge of it; that in caſe it ſhould be loſt, it might be brought to the proper perſon: but if he could not be found, the bird is delivered to another officer, called the *guardian of loſt birds*; who keeps it till it is demanded

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Falco. manded by the falconer to whom it belonged. That this great officer may the more readily be found among the army of hunters who attend the emperor, he erects a ſtandard in the moſt conſpicuous place.

24. The niſus, or ſparrow-hawk, with green wax, yellow legs, a white belly undulated with grey, and the tail marked with blackiſh belts. This is the moſt pernicious hawk we have; and makes great havoc among pigeons as well as partridges. It builds in hollow trees, in old neſts of crows, large ruins, and high rocks: it lays four white eggs, encircled near the blunter end with red ſpecks.

25. The minutus, with white wax, yellow legs, and the body white underneath. It is the leaſt hawk of Briſſons, being about the ſize of a thruſh; and is found on the iſland Melita.

There are near 100 other ſpecies diſtinguiſhed by ornithologiſts. Among theſe are two deſcribed by Mr Bruce; one of which deſerves particular notice here, as being not only the largeſt of the eagle kind, but, in our author's opinion, the largeſt bird that flies. He calls it the *golden eagle*; by the natives it is vulgarly called *abon duchn*, or *father long-beard*. It is not an object of any chace, nor ſtood in need of any ſtratagem to bring it within reach. Upon the higheſt top of the mountain Lamalmon, while Mr Bruce's ſervants were refreſhing themſelves from that toilſome rugged aſcent, and enjoying the pleaſure of a moſt delightful climate, eating their dinner in the outer air with ſeveral large diſhes of boiled goats fleſh before them, this eagle ſuddenly made its appearance; he did not ſtoop rapidly from a height, but came flying ſlowly along the ground, and ſat down cloſe to the meat within the ring the men had made round it. A great ſhout, or rather cry of diſtreſs, which they raiſed, made the bird ſtand for a minute as if to recollect himſelf, while the ſervants ran for their lances and ſhields. His attention was fully fixed upon the fleſh. He put his foot into the pan where was a large piece in water prepared for boiling; but finding the ſmart which he had not expected, he withdrew it, and forſook the piece which he held. There were two large pieces, a leg and a ſhoulder, lying upon a wooden platter; into theſe he truſſed both his claws and carried them off; ſkimming ſlowly along the ground as he had come, till he diſappeared behind a cliff. But being obſerved at his departure to look wiſtfully at the large piece which remained in the warm water, it was concluded that he would ſoon return: in expectation of which Mr Bruce loaded a rifle-gun with ball, and ſat down cloſe to the platter by the meat. It was not many minutes before he came, and a prodigious ſhout was raiſed by the attendants, "He is coming, he is coming!" enough to have diſcouraged a leſs courageous animal. Whether it was not quite ſo hungry as at the firſt viſit, or ſuſpected ſomething from Mr Bruce's appearance, it made a ſmall turn, and ſat down about ten yards from him, the pan with the meat being between them. In this ſituation Mr Bruce fired, and ſhot him with the ball through the middle of his body about two inches below the wing, ſo that he lay down upon the graſs without a ſingle flutter. Upon laying hold of his monſtrous carcaſe, our author was not a little ſurpriſed at ſeeing his hands covered and tinged with yellow powder or duſt. Upon turning him upon his belly, and examining the feathers of his back, they produced a brown duſt, the colour of the feathers there. This duſt was not in ſmall quantities; for upon ſtriking his breaſt, the yellow powder flew in fully greater quantity than from a hair-dreſſer's powder puff. The feathers of the belly and breaſt, which were of a gold colour, did not appear to have any thing extraordinary in their formation, but the large feathers in the ſhoulder and wings ſeemed apparently to be fine tubes, which upon preſſure ſcattered this duſt upon the finer part of the feather, but this was brown, the colour of the feathers of the back. Upon the ſide of the wing, the ribs, or hard part of the feather, ſeemed to be bare as if worn, or, in our author's opinion, were rather renewing themſelves, having before failed in their function. What is the reaſon of this extraordinary proviſion of nature, our author does not pretend to determine. But as it is an unuſual one, it is probably meant, he thinks, for a defence againſt the climate in favour of thoſe birds which live in theſe almoſt inacceſſible heights of a country doomed even in its lower parts to ſeveral months of exceſſive rain. According to Mr Bruce's deſcription, this bird, from wing to wing, was 8 feet 4 inches; from the tip of his tail to the point of his beak when dead, 4 feet 7 inches. He was remarkably ſhort in the legs, being only four inches from the joining of the foot to where the leg joins the thigh, and from the joint of the thigh to the joining of his body ſix inches. The thickneſs of his thigh was little leſs than four inches; it was extremely muſcular, and covered with fleſh. His middle claw was about two inches and a half long, not very ſharp at the point, but extremely ſtrong. From the root of the bill to the point was three inches and a quarter, and one inch and three quarters in breadth at the root. A forked bruſh of ſtrong hair, divided at the point into two, proceeded from the cavity of his lower jaw at the beginning of his throat. His eye was remarkably ſmall in proportion to his bulk, the aperture being ſcarcely half an inch. The crown of his head was bare or bald, as was alſo the front where the bill and ſkull joined.

Falco, Falcon.

FALCON, or FAUCON, a bird of prey of the hawk kind, ſuperior to all others for courage, docility, gentleneſs, and nobleneſs of nature *. Several authors take the name *falcon* to have been occaſioned by its crooked talons or pounces, which reſemble a falx or ſickle. Giraldus derives it *a falcando*, becauſe it flies in a curve.

* See *Falco*.

The falcon, or falcon gentle, is both for the fiſt and for the lure. In the choice, take one that has wide noſtrils, high and large eye-lids, a large black eye; a round head, ſomewhat full on the top; barb feathers on the clap of the beaks, which ſhould be ſhort, thick, and of an azure colour; the breaſt large, round, and fleſhy; and the thighs, legs, and feet, large and ſtrong; with the fear of the foot ſoft and bluiſh: the pounces ſhould be black, with wings long and croſſing the train, which ſhould be ſhort and very pliable.

The name *falcon* is reſtrained to the female: for the male is much ſmaller, weaker, and leſs courageous, than the female; and therefore is denominated *taſſel*, or *tircelet*. The falcon is excellent at the river, brook, and even field; and flies chiefly at the larger game, as wild-gooſe, kite, crow, heron, crane, pye, ſhoveler, &c. For further particulars, ſee FALCONRY, HAWK, and HAWKING.

The cuſtom of carrying a falcon extended to many

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Falconer, Falconry.

countries, and was eſteemed a diſtinction of a man of rank. The Welſh had a ſaying, that you may know a gentleman by his hawk, horſe, and grehound. In fact, a perſon of rank ſeldom went without one on his hand. Harold, afterwards king of England, is painted going on a moſt important embaſſy, with a hawk on his hand and a dog under his arm. Henry VI. is repreſented at his nuptials, attended by a nobleman and his falcon. Even the ladies were not without them in earlier times; for in an ancient ſculpture in the church of Milton Abbas, in Dorſetſhire, appears the conſort of king Athelſtan with a falcon on her royal fiſt tearing a bird.

FALCONER, a perſon who brings up, tames, and makes, that is, tutors and manages, birds of prey; as falcons, hawks, &c. See FALCONRY.

The grand ſeignior uſually keeps 6000 falconers in his ſervice.—The French king has a grand falconer, which is an office diſmembered from that of great hunt, *grand venur*. Hiſtorians take notice of this poſt as early as the year 1250.

A falconer ſhould be well acquainted with the quality and mettle of his hawks, that he may know which of them to fly early and which late. Every night after flying he ſhould give them caſting; one while plumage, ſometimes pellets of cotton, and at another time phyſic, as he finds neceſſary. He ought alſo every evening to make the place clean under the porch, that by her caſting he may know whether ſhe wants ſcouring upwards or downwards. Nor muſt he forget to water his hawk every evening, except on ſuch days as ſhe has bathed; after which, at night, ſhe ſhould be put into a warm room, having a candle burning by her, where ſhe is to ſit unhooded, if ſhe be not ramage, that ſhe may pick and prune herſelf.—A falconer ſhould always carry proper medicines into the field, as hawks frequently meet with accidents there. Neither muſt he forget to take with him any of his hawking implements; and it is neceſſary he ſhould be ſkilful in making lures, hoods of all ſorts, jeſſes, bewets, and other furniture. Neither ought he to be without his coping irons, to cope his hawk's beak when overgrown, and to cut her pounces and talons as there ſhall be occaſion: nor ſhould his cauterizing irons be wanting.

FALCONER (William), an ingenious Scots ſailor, who, about the year 1762, came up to London with a pretty pathetic poem, called the *Shipwreck*, founded on a diſaſter of his own experience. The publication of this piece recommended him to the late duke of York; and he would in all probability have been ſuitably preferred, if a ſecond ſhipwreck, as may be ſuppoſed, had not proved fatal to him, and to many gentlemen of rank and fortune with whom he ſailed. In 1760, he went out a volunteer in the Aurora frigate ſent to carry Meſſrs Vanſittart, Scraſton, and Ford, the ſupervifors appointed to regulate our Eaſt India ſettlements; which veſſel, after it had touched at the Cape of Good Hope, was never more heard of. Before his departure, he publiſhed a very uſeful *Marine Dictionary*, in 1 vol. 4to.

FALCONRY, the art of training all manner of hawks, but more eſpecially the larger ones called *falcons*, to the exerciſe of hawking. See HAWKING.

When a falcon is taken, ſhe muſt be ſeeled in ſuch a manner, that, as the ſeeling ſlackens, ſhe may ſee what proviſion lies before her; but care ought to be taken, not to ſeel her too hard. A falcon or hawk newly taken ſhould have all new furniture, as new jeſſes of good leather, mailled leaſhes with buttons at the end, and new bewets. There ſhould alſo be provided a ſmall round ſtick, to ſtroke the hawk; becauſe, the oftener this is done, the ſooner and better will ſhe be manned. She muſt alſo have two good bells, that ſhe may be found when ſhe ſcattereth. Her hood ſhould be well faſhioned, raiſed, and emboſſed againſt her eyes, deep, and yet ſtrait enough beneath, that it may faſten about her head without hurting her; and her beak and talons muſt be a little coped, but not ſo near as to make them bleed. Falconry.

If it be a ſoar-falcon, which hath already paſſed the ſeas, ſhe will indeed be harder to reclaim, but will prove the beſt of falcons. Her food muſt be good and warm, and given her twice or thrice a-day, till ſhe be full gorged: the beſt for this purpoſe is pigeons, larks, or other live birds; becauſe ſhe muſt be broken off by degrees from her accuſtomed feeding. When ſhe is fed, you muſt hoop and lure, as you do when you call a hawk, that ſhe may know when you intend to give her meat. On this occaſion ſhe muſt be unhooded gently; and after giving her two or three bits, her hood muſt be put on again, when ſhe is to get two or three bits more. Care muſt be taken that ſhe be cloſe ſeeled; and after three or four days, her diet may be leſſened: the falconer ſetting her every night to pearch by him, that he may awaken her often in the night. In this manner he muſt proceed, till he find her to grow tame and gentle; and when ſhe begins to feed eagerly, he may give her a ſheep's heart. He may now begin to unhood her in the day-time; but it muſt be far from company, firſt giving her a bit or two, then hooding her gently, and giving her as much more. When ſhe is ſharp ſet, he may now unhood her, and give her ſome meat juſt againſt his face and eyes, which will make her leſs afraid of the countenances of others. She muſt be borne continually on the fiſt, till ſhe is properly manned, cauſing her to feed in company, giving her in the morning, about ſun-riſe, the wing of a pullet; and in the evening, the foot of a hare or coney, cut off above the joint, ſlead and laid in water, which being ſqueezed, is to be given her with the pinion of a hen's wing. For two or three days give her waſhed meat, and then plumage in more or leſs quantity as ſhe is thought to be more or leſs foul within. After this, being hooded again, ſhe is to get nothing till ſhe has gleamed and caſt, when a little hot meat may be given her in company; and, towards evening, ſhe may be allowed to plume a hen's wing in company alſo. Cleanſe the feathers of her caſting, if foul and ſlimy; if ſhe be clean within, give her gentle caſtings; and when ſhe is reclaimed, manned, and made eager and ſharp ſet, he may venture to feed her on the lure.

However, three things are to be conſidered before the lure be ſhowed her, 1. That ſhe be bold and familiar in company, and not afraid of dogs and horſes. 2. Sharp ſet and hungry, having regard to the hour of morning and evening, when you would lure her. 3. Clean within, and the lure well garniſhed with meat on both ſides; and when you intend to give her the length of a leaſh, you muſt abſcond yourſelf.

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Falconry || Falisci.

She muſt alſo be unhooded, and have a bit or two given her on the lure as ſhe ſits on your fiſt; afterwards take the lure from her, and hide it that ſhe may not ſee it; and when ſhe is unfeeled, caſt the lure ſo near her, that ſhe may catch it within the length of her leaſh, and as ſoon as ſhe has ſeized it, uſe your voice as falconers do, feeding her upon the lure, on the ground, with the heart and warm thigh of a pullet.

Having ſo lured your falcon, give her but little meat in the evening; and let this luring be ſo timely, that you may give her plumage, and a juck of a joint next morning on your firſt. When ſhe has caſt and gleamed, give her a little reaching of warm meat. About noon, tie a creance to her leaſh; and going into the field, there give her a bit or two upon her lure: then unwind the creance, and draw it after you a good way; and let him who has the bird hold his right hand on the taſſel of her hood, ready to unhood her as ſoon as you begin to lure; to which if ſhe come well, ſtoop roundly upon it, and haſtily ſeize it, let her caſt two or three bits thereon. Then, unſeizing and taking her off the lure, hood her and give her to the man again; and, going farther off, lure and feed her as before.

In this manner is the falconer to proceed, luring her every day farther and farther off, till ſhe is accuſtomed to come freely and eagerly to the lure; after which ſhe may be lured in company, taking care that nothing affright her. When ſhe is uſed to the lure on foot, ſhe is to be lured on horſeback; which may be effected the ſooner, by cauſing horſemen to be about her when ſhe is lured on foot.

When ſhe has grown familiar to this way, let ſomebody on foot hold the hawk, and he on horſeback muſt call and caſt the lure about his head, the holder taking off the hood by the taſſel; and if ſhe ſeize eagerly on the lure without fear of man or horſe, then take off the creance, and lure her at a greater diſtance. And if you would have her love dogs as well as the lure, call dogs when you give her her living or plumage. See the article HAWKING.

FALERII (anc. geog.), a town of Etruria, on the weſt or right ſide of the Tiber; Faliſci, the people of the town and territory. The territory was famous for its rich paſtures; hence the *gramen Faliſcum* in authors. Eutropius and Frontinus call the town *Faliſci*; which, according to the laſt, was ſurnamed *Colonia Junonia*. The Faliſci are called *Aequi* by Virgil; becauſe they afforded ſupplimental laws to the 12 tables, (Servius). Here they made an excellent ſauſage, called *Venter Faliſcus* (Martial).

When the Faliſci were beſieged by Camillus, a ſchoolmaſter went out of the gates of the city with his pupils, and propoſed to betray them into the hands of the Roman enemy, that by ſuch a poſſeſſion he might eaſily oblige the place to ſurrender. Camillus heard the propoſal with indignation, and ordered the man to be ſtripped naked, and whipped back to the town by thoſe whom his perfidy wiſhed to betray. This inſtance of generoſity operated upon the people ſo powerfully that they ſurrendered to the Romans.

FALERNUS, *Mons Maſſicus* ſo called, (Martial); Falernus ager, a diſtrict at the foot of mount Maſſicus in Campania; famous for its generous wines, (Horace, Pliny). Now called *Monte Maſſico*.

FALISCI. See FALERII.

Falkia || Falkland.

FALKIA, in botany: A genus of the trigynia order, belonging to the hexandria claſs of plants. The calyx is monophyllous; the corolla monopetalous; the ſeeds four in number.

FALKIRK, a town of Stirlingſhire in Scotland, ſituated in W. Long. 3. 48. N. Lat. 56. 20. It is a large ill-built place, and is ſupported by great fairs for black cattle from the Highlands, it being computed that 24,000 head are annually ſold there. A great deal of money is alſo got here by the carriage of goods landed at Carron wharf to Glaſgow. This town is remarkable for a battle fought in its neighbourhood between Edward I of England, and the Scots commanded by the Steward of Scotland, Cummin of Badenoch, and Sir William Wallace. The latter had been inveſted with the ſupreme command; but perceiving that this gave umbrage to the nobility, he reſigned his power into the hands of the nobleman above mentioned, reſerving to himſelf only the command of a ſmall body who refuſed to follow another leader. The Scots generals placed their pikemen along the front, and lined the intervals between the three bodies of which their army was compoſed, with archers; and dreading the great ſuperiority of the Engliſh cavalry, endeavoured to ſecure their front by palliſadoes tied together with ropes. The battle was fought on the 22d of July 1298. The king of England divided his army likewiſe into three bodies; and by the ſuperiority of his archers, defeated the Scots with great ſlaughter. Wallace alone preſerved entire the troops he commanded; and retiring behind the Carron, marched leiſurely along the banks of that river, which protected him from the enemy. In this battle fell John de Graham, a gentleman much celebrated for his valour, and ſtyled the *right-hand* of the gallant Wallace. His epitaph is ſtill to be ſeen on a plain ſtone in the church-yard of Falkirk. On the 18th of January 1746, a battle was fought here between the king's forces commanded by general Hawley, and the Highlanders headed by Charles Stuart. The former was ſeized with a panic, and fled; but Colonel Huſk with two regiments, who kept their ground, prevented the Highlanders from purſuing their victory. Extenſive ruins are perceived in the neighbourhood of this town, ſuppoſed by ſome antiquarians to have been the capital of the Pictiſh government; but others believe them to be the remains of ſome Roman ſtations.

FALKLAND, a ſmall town of Fifeſhire in Scotland, made a royal burgh by James II. in 1458. Here ſtood one of the ſeats of the Macduffs earls of Fife. On the attainder of Munro Stewart, the 17th earl, it became forfeited to the crown in 1424. James V. who grew very fond of the place, enlarged and improved it. The remains evince its former magnificence and elegance, and the fine taſte of the princely architect. The gateway is placed between two fine round towers; on the right-hand joins the chapel, whoſe roof is of wood, handſomely gilt and painted, but in a moſt ruinous condition. Beneath are ſeveral apartments. The front next to the court was beautifully adorned with ſtatues, heads in baſs-relief, and elegant columns not reducible to any order, but of fine proportion, with capitals approaching the Ionic ſcroll. Beneath ſome of theſe pillars was inſcribed I. R. M. G. 1537: or *Jacobus Rex, Maria de Guiſe*.—This place was alſo

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Falkland Fall.

a favourite reſidence of James VI. on account of the fine park and plenty of deer. The eaſt ſide was accidentally burnt in the time of Charles II. and the park ruined during Cromwell's uſurpation; when the fine oaks were cut down in order to build the fort at Perth. —This place gives title of viſcount to the Engliſh family of Carey; Sir Henry Carey being ſo created by James VI. 1620. His ſon was the celebrated Lucius, who ſacrificed his life in a fit of loyal deſpair at the battle of Newbury, and from whom Lucius Charles the preſent viſcount is the fifth in lineal deſcent.

FALKLAND (Lord). See CAREY.

FALL, the deſcent of a heavy body towards the centre of the earth. It is alſo the name of a meaſure of length uſed in Scotland, containing ſix ells.

FALL of Man, in ſacred hiſtory, that terrible event by which ſin and death were introduced into the world. See ADAM, and ANTEDILUVIANS, and *Original SIN*. The account which Moſes gives of this tranſaction is extremely brief and conciſe. The ſerpent, he informs us, being more ſubtile than any beaſt of the field, aſked the woman, whether it was true that God had not granted her and her huſband leave to eat of every tree in the garden? ſhe anſwered, that God had allowed them to eat of all, except only the fruit of the tree in the midſt of the garden; which he commanded they ſhould not taſte, nor ſo much as touch, leſt they ſhould die. The ſerpent replied, that they ſhould not die; for God knew the virtue of the tree; and that, ſo ſoon as they eat of it, their eyes would be opened, and they would become like gods, knowing good and evil. Eve, ſeeing the fruit tempting to the view, took of the fruit and ate; and gave alſo to her huſband of it, and he did eat. Immediately the eyes of both were opened; when perceiving they were naked, they ſewed fig-leaves together, and made themſelves aprons. Adam and Eve, hearing the voice of God walking in the garden in the cool of the day, hid themſelves among the trees; but, on God's calling for Adam, he excuſed himſelf for not appearing, becauſe he was naked. God demanded of him, who it was that told him he was naked; and whether he had diſobeyed his command, in eating the forbidden fruit? Adam confeſſed that the woman had offered him the fruit, and he had taſted it. She, being examined likewiſe, acknowledged what ſhe had done; but ſaid, the ſerpent had ſeduced and deceived her. God then proceeded to judgment; he firſt curſed the ſerpent above all beaſts, and condemned him to go on his belly, and eat the duſt; adding, that he would put enmity between him and the woman, and their offſpring; that the ſeed of the woman ſhould bruiſe the ſerpent's head, who ſhould bruiſe the other's heel. The woman was ſubjected to the pains of childbirth, as well as to the dominion of her huſband; and as to the man, God curſed the ground for his ſake, declaring, that it ſhould bring forth thorns and thiſtles, and he ſhould earn his bread by the ſweat of his brow, till he returned to the duſt, from whence he was taken. At laſt, having clothed them both with ſkins, he turned them out of the garden, leſt they ſhould take of the tree of life, and eat, and live for ever: then, to prevent any attempt to return to their former habitation, he placed cherubims at the eaſt of the garden, and a flaming ſword, which turned every way, to guard the paſſage to the tree of life. Fall.

This conciſe account being, at firſt view, incumbered with ſome difficulties, ſeveral learned and pious men have been inclined to believe the whole ought to be taken in an allegorical ſenſe, and not according to the ſtrictneſs of the letter: they allege, that the ancients, and particularly the eaſtern nations, had two different ways of delivering their divinity and philoſophy, one popular, and the other myſterious; that the ſcripture uſes both occaſionally; ſometimes accommodating itſelf to the capacities of the people, and at other times to the real but more veiled truth; and that, to obviate the many difficulties which occur in the literal hiſtory of this ſad cataſtrophe, the ſafeſt way is to underſtand it as a parabolical ſtory, under which the real circumſtances are diſguiſed and concealed, as a myſtery not fit to be more explicitly declared.

Though it cannot be denied that ſome of the ancient philoſophers affected ſuch an allegorical way of writing, to conceal their notions from the vulgar, and keep their learning within the bounds of their own ſchool; yet it is apparent Moſes had no ſuch deſign; and as he pretends only to relate matters of fact, juſt as they happened, without art or diſguiſe, it cannot be ſuppoſed but that this hiſtory of the fall is to be taken in a literal ſenſe, as well as the reſt of his writings. It is generally agreed, that the ſerpent which tempted Eve was the Devil, who envying the privileges of man in innocence, tempted him, and was the cauſe of his forfeiting all thoſe advantages which he had received from God at his creation; and that to this end he aſſumed the form of a ſerpent. Theſe interpretations are ſupported by many paſſages of Scripture, where the Devil is called the *ſerpent*, and the *old ſerpent*, (See John viii. 44. 2 Cor. xi. 3. and Rev. xii. 9.) Some believe that the ſerpent had then the uſe of ſpeech, and converſed familiarly with the woman, without her conceiving any diſtruſt of him; and that God, to puniſh the malice with which he had abuſed Eve, deprived him of the uſe of ſpeech. Others maintain, that a real ſerpent having eaten of the forbidden fruit, Eve from thence concluded, that ſhe too might eat of it without danger; that in effect ſhe did eat of it, and incurred the diſpleaſure of God by her diſobedience. This, ſay theſe laſt authors, is the plain matter of fact which Moſes would relate under the allegorical repreſentation of the ſerpent converſing with Eve.

The opinion of ſuch as believe this was not a real ſerpent, but only the Devil under that name, is no leſs liable to exception than any of the reſt. For though the Devil is frequently ſtyled in Scripture the *ſerpent*, and the *old ſerpent*, yet why he ſhould be called the *moſt ſubtile beaſt of the field*, we cannot conceive; neither will the puniſhment inflicted on the ſerpent ſuffer us to doubt, but that a ſerpent's body at leaſt was employed in the tranſaction.

The nature of the forbidden fruit is another circumſtance in this relation that has occaſioned no leſs variety of conjectures. The Rabbins believe it was the vine; others that it was wheat; and others, from the circumſtance of Adam and Eve's covering themſelves with fig-leaves immediately after their tranſgreſſion, tell us, that this fruit muſt have been the fig; ſome think

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Fallacy ‖ Fallopius.

think it was the cherry; and the generality of the Latins will have it to be the apple.

Those who admire allegorical interpretations, will have the forbidden fruit to have been no other than the sensual act of generation, for which the punishment inflicted on the woman was the pain of child-bearing. But this opinion has not the least foundation in the words of Moses, especially if we consider that Adam knew not his wife till after their expulsion out of Paradise.

Many have been the suppositions and conjectures upon this subject in general; and some have so far indulged their fancy in the circumstances of the fall, that they have perverted the whole narration of Moses into a fable full of the most shameful extravagancies.

FALLACY, a deception, fraud, or false appearance.

The Epicureans deny that there is any such thing as a fallacy of the senses: for, according to them, all our sensations and perceptions, both of sense and phantasy, are true; whence they make sense the primary criterion of truth.

The Cartesians, on the other hand, maintain, that we should suspect as false, or at most as dubious, every thing that presents itself to us by means only of the external senses, because they frequently deceive us. They add, that our senses, as being fallacious, were never given us by nature for the discovery of truth, or the contemplation of the principles of things; but only for pointing out to us what things are convenient or hurtful to our bodies.

The Peripatetics keep a middle course. They say, that if a sensible object be taken in its common or general view, the sense cannot be deceived about it; but that if the object be taken under its specific view, the sense may be mistaken about it, from the want of the dispositions necessary to a just sensation, as a disorder in the organ, or any thing uncommon in the medium: thus, in some disorders of the eye, all objects appear yellow; a stick in water appears broken or crooked, &c.

FALLING-SICKNESS, or EPILEPSY. See MEDICINE-*Index*.

FALLING-STARS, See STAR.

FALLOPIAN TUBES, in anatomy, two ducts arising from the womb, one on each side of the fundus, and thence extended to the ovaries, having a considerable share in conception. They are called *tubæ*, from their form, which bears some resemblance to a trumpet; and their denomination, *Fallopianæ*, they take from Gabriel Fallopius, mentioned in the next article. See ANATOMY, p. 740. col. 2.

FALLOPIUS (Gabriel), a most celebrated physician and anatomist, was born at Modena in Italy, in the year 1523, and descended of a noble family. He made several discoveries in anatomy, one of which was that of the tubes, called from him the *Fallopian tubes*. He travelled through the greatest part of Europe, and obtained the character of being one of the ablest physicians of his age. He was made professor of anatomy at Pisa in the year 1548, and at Padua in the year 1551: here he died in 1562, aged 39. His writings, which are numerous, were first printed separately, and afterwards collected under the title of "Opera genuina omnia, tam practica quam theoretica, in tres tomos distributa." They were printed at Venice in 1585, and in 1606; at Francfort in 1600, *cum operum appendice*; and in 1606, in folio.

Fallow ‖ False.

FALLOW, a pale red-colour, like that of brick half-burnt; such is that of a fallow-deer.

Fallow-Field, or *Fallow-ground*; land laid up, or that has been untilled for a considerable time.

FALLOWING *of* LAND, a particular method of improving land. See AGRICULTURE, n° 14, 15, 185.

FALMOUTH, a port-town of Cornwall in England, situated in W. Long. 5. 30. N. Lat. 50. 15. on a fine bay of the English channel. It is the richest and most trading town of the county, and larger than any three of its boroughs that send members to parliament. It is so commodious a harbour, that ships of the greatest burden come up to its quay. It is guarded by the castle of St Mawes and Pendennis, on a high rock at the entrance; and there is such shelter in the many creeks belonging to it, that the whole royal navy may ride safe here in any wind, it being next to Plymouth and Milford-Haven, the best road for shipping in Great Britain. It is well-built; and its trade is considerably increased since the establishment of the packet-boats here for Spain, Portugal, and the West Indies, which not only bring vast quantities of gold in specie and in bars, on account of the merchants in London; but the Falmouth merchants trade with the Portuguese in ships of their own, and they have a great share also in the gainful pilchard trade. The custom-house for most of the Cornish towns, as well as the head collector, is settled here, where the duties, including those of the other ports, are very considerable. It is a corporation, governed by a mayor and aldermen. Here is a market on Thursday, and fairs July 27. and October 30.

FALSE, in general, something contrary to truth, or not what it ought to be: thus we say a false action, false weights, false claim, &c.

False Action, if brought against one whereby he is cast into prison, and dies pending the suit, the law gives no remedy in this case, because the truth or falsehood of the matter cannot appear before it is tried: and if the plaintiff is barred, or non-suited at common law, regularly all the punishment is amercement.

False Imprisonment, is a trespass committed against a person, by arresting and imprisoning him without just cause, contrary to law; or where a man is unlawfully detained without legal process: and it is also used for a writ which is brought for this trespass. If a person be any way unlawfully detained, it is false imprisonment; and considerable damages are recoverable in those actions.

False News, spreading of, in order to make discord between the king and nobility, or concerning any great man of the realm, is punishable by common law with fine and imprisonment; which is confirmed by statutes Westm. 1. 3 Edw. I. cap. 34. 2 Ric. II. stat. 1. cap. 5. & 12 Ric. II. cap. 11.

False Oath. See PERJURY.

False Prophecy. See PROPHECY.

False Quarter, in farriery. See QUARTERS.

False Bay, a bay lying to the eastward of the Cape of Good Hope; frequented by vessels during the prevalence of the north-westerly winds, which begin to exert their influence in May, and render it dangerous to remain in Table Bay. It is terminated to the east-

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Falſi Fama.

ward by Falſe Cape, and to the weſtward by the Cape of Good Hope. It is 18 miles wide at its entrance, and the two capes bear due eaſt and weſt from each other.

FALSI CRIMEN, in the civil law, is fraudulent ſubornation or concealment, with deſign to darken or hide the truth, and make things appear otherwiſe than they are. The *crimen falſi* is committed, 1. By words, as when a witneſs ſwears falſely. 2. By writing, as when a man antedates a contract, or the like. 3. By deed, as when he ſells by falſe weights and meaſures.

FALSIFY, in law, is uſed for proving any thing to be falſe. Hence we find

FALSIFYING a record, for ſhowing it to be erroneous. Thus lawyers teach, that a perſon purchaſing land of another, who is afterwards outlawed of felony, &c. may falſify the record, not only as to the time wherein the felony is ſuppoſed to have been committed, but alſo as to the point of the offence. But where a man is found guilty by verdict, a purchaſer cannot falſify as to the offence; though he may for the time where the party is found guilty generally in the indictment, becauſe the time is not material upon evidence.

EALSTAFF. See FASTOLFF.

FALX, in anatomy, a part of the dura mater, deſcending between the two hemiſpheres of the brain, and ſeparating the fore-part from the hinder. It is called *falx*. i. e. "ſickle," becauſe of its curvature, occaſioned by the convexity of the brain. It divides the brain as low as the corpus calloſum.

FAMA CLAMOSA, in the judicial procedure of the church of Scotland, a ground of action before a preſbytery againſt one of its members, independent of any regular complaint by a particular accuſer. See PRESBYTERY.

Any perſon who is of a good character, may give to the preſbytery a complaint againſt one of their members; but the preſbytery is not to proceed to the citation of the perſon accuſed, until the accuſer under his hand gives in the complaint, with ſome account of its probability, and undertakes to make out the libel, under the pain of being conſidered as a ſlanderer. When ſuch an accuſation is brought before them, they are obliged candidly to examine the affair. But, beſides this, the preſbytery conſiders itſelf obliged to proceed againſt any of its members, if a fama clamoſa of the ſcandal is ſo great that they cannot be vindicated unleſs they begin the proceſs. This they can do without any particular accuſer, after they have inquired into the riſe, occaſion, and authors, of this report. It is a maxim in the kirk of Scotland, that religion muſt ſuffer if the ſcandalous or immoral actions of a miniſter are not corrected. And wherever a miniſter is reputed guilty of any immorality (although before the moſt popular preacher in the kingdom), none almoſt will attend upon his miniſtry. Therefore the preſbytery, for the ſake of religion, is obliged to proceed againſt a miniſter in caſe of a fama clamoſa. This, however, is generally done with great tenderneſs. After they have conſidered the report raiſed againſt him, then they order him to be cited, draw out a full copy of what is reported, with a liſt of the witneſſes names to be led for proving this allegation. He is now to be formally ſummoned to appear before them; and he has warning given him, at leaſt 10 days before the time of his compearance, to give in his anſwers to what is termed the *libel*; and the names of the witneſſes ought alſo to be ſent him. If at the time appointed the miniſter appear, the libel is to be read to him, and his anſwers are alſo to be read. If the libel be found relevant, then the preſbytery is to endeavour to bring him to a confeſſion. If the matter confeſſed be of a ſcandalous nature, ſuch as uncleanneſs, the preſbytery generally depoſe him from his office, and appoint him in due time to appear before the congregation where the ſcandal was given, and to make public confeſſion of his crime and repentance. If a miniſter abſent himſelf by leaving the place, and be contumacious, without making any relevant excuſe, a new citation is given him, and intimation is made at his own church when the congregation is met, that he is to be holden as confeſſed, ſince he refuſed to appear before them; and accordingly he is depoſed from his office.

Fame || Family.

FAME, a heathen goddeſs, celebrated chiefly by the poets. She is feigned to have been the laſt of the race of Titans produced by the earth, to have her palace in the air, and to have a vaſt number of eyes, ears, and tongues. She is mentioned by Heſiod, and particularly deſcribed by Ovid and Virgil.

FAMES CANINA, the ſame with BULIMY.

FAMIA, or AFAMIA, the modern name of one of the ancient Apameas. See APAMEA.

FAMILIARS of the INQUISITION, perſons who aſſiſt in apprehending ſuch as are accuſed, and carrying them to priſon. They are aſſiſtants to the inquiſitor, and called *familiars*, becauſe they belong to his family. In ſome provinces of Italy they are called *croſs-bearers*, and in others the *ſcholars of St Peter the martyr*; and they wore a croſs before them on the outſide garment. They are properly bailiffs of the inquiſition; and the vile office is eſteemed ſo honourable, that noblemen in the kingdom of Portugal have been ambitious of belonging to it. Nor is this ſurpriſing, when it is conſidered that Innocent III. granted very large indulgences and privileges to theſe familiars; and that the ſame plenary indulgence is granted by the pope to every ſingle exerciſe of this office, as was granted by the Lateran council to thoſe who ſuccoured the Holy Land. When ſeveral perſons are to be taken up at the ſame time, theſe familiars are commanded to order matters, that they may know nothing of one another's being apprehended; and it is related, that a father and his three ſons, and three daughters, who lived together in the ſame houſe, were carried priſoners to the inquiſition without knowing any thing of one another's being there till ſeven years afterwards, when they that were alive were releaſed by an act of faith.

FAMILY, denotes the perſons that live together in one houſe, under the direction of one head or chief manager. It alſo ſignifies the kindred or lineage of a perſon; and is uſed by old writers for a hide or portion of land ſufficient to maintain one family. See HIDE.

FAMILY, in natural hiſtory, a term uſed by authors to expreſs any order of animals, or other natural productions of the ſame claſs. See CLASS and ORDER.

FA-

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Famine, Fan.

FAMINE, dearth, or ſcarcity of food. For preſervatives againſt hunger in times of famine, ſee the article HUNGER.

FAN, a machine uſed to raiſe wind, and cool the air by agitating it.

That the uſe of the fan was known to the ancients is very evident from what Terence ſays,

Cape hoc flabellum, *et ventulum huic fac ſcito;*

and from Ovid, Aſt. Amand. i. 161.

Profuit et tenues ventos moviſſe flabello.

The fans of the ancients were made of different materials; but the moſt elegant were compoſed of peacocks feathers, or perhaps painted, ſo as to repreſent a peacock's tail.

The cuſtom which now prevails among the ladies of wearing fans, was borrowed from the eaſt, where the hot climate renders the uſe of fans and umbrellas almoſt indiſpenſable.

In the eaſt they chiefly uſe large fans made of feathers, to keep off the ſun and the flies. In Italy and Spain they have a large ſort of ſquare fans, ſuſpended in the middle of their apartments, and particularly over the tables: theſe, by a motion at firſt given them, and which they retain a long time on account of their perpendicular ſuſpenſion, help to cool the air and drive off flies.

In the Greek church, a fan is put into the hands of the deacons in the ceremony of their ordination, in alluſion to a part of the deacon's office in that church, which is to keep the flies off the prieſts during the celebration of the ſacrament.

What is called a *fan* amongſt us and throughout the chief parts of Europe, is a thin ſkin, or piece of paper, taffety, or other light ſtuff, cut ſemicircularly, and mounted on ſeveral little ſticks of wood, ivory, tortoiſe-ſhell, or the like. If the paper be ſingle, the ſticks of the mounting are paſted on the leaſt ornamental ſide: if double, the ſticks are placed betwixt them. Before they proceed to place the ſticks, which they call *mounting the fan*, the paper is to be plaited in ſuch manner, as that the plaits may be alternately inward and outward.

It is in the middle of each plait, which is uſually about half an inch broad, that the ſticks are to be paſted; and theſe again are to be all joined and rivetted together at the other end; they are very thin, and ſcarce exceed one-third of an inch in breadth; and where they are paſted to the paper, are ſtill narrower, continuing thus to the extremity of the paper. The two outer ones are bigger and ſtronger than the others. The number of ſticks rarely exceeds 22. The ſticks are uſually provided by the cabinet-makers or toymen; the fan-painters plait the papers, paint, and mount them.

The common painting is either in colours or gold-leaf, applied on a ſilvered ground, both prepared by the gold-beaters. Sometimes they paint on a gold ground, but it is rarely; true gold being too dear, and falſe too paltry. To apply the ſilver leaves on the paper, they uſe a compoſition, which they pretend is a great ſecret, but which appears to be no other than gum Arabic, ſugar-candy, and a little honey melted in common water, and mixed with a little brandy. This compoſition is laid on with a ſponge; then laying the ſilver leaves thereon, and preſſing them gently down with a linen ball ſtuffed with cotton, they catch hold, and adhere together. When, inſtead of ſilver, gold ground is laid, the ſame method is obſerved. The ground being well dried, a number of the papers are well beaten together on a block, and by this means the ſilver or gold get a luſtre as if they had been burniſhed.

Fan ‖ Fanſhaw.

FAN is alſo an inſtrument to winnow corn.—The machine uſed for this purpoſe by the ancients ſeems to have been of a form ſimilar to ours. The fan, which Virgil calls *myſtica vannus Iacchi*, was uſed at initiations into the myſteries of the ancients: For as the perſons who were initiated into any of the myſteries, were to be particularly good, this inſtrument, which ſeparates the wheat from the chaff, was the fitteſt emblem that could be of ſetting apart the good and virtuous from the vicious and uſeleſs part of mankind. It is figuratively applied in a ſimilar manner in Luke iii. 17.

FANATICS, wild, enthuſiaſtic, viſionary perſons, who pretend to revelation and inſpiration.

The ancients called thoſe *fanatici* who paſſed their time in temples *(fana)*, and being often ſeized with a kind of enthuſiaſm, as if inſpired by the divinity, ſhowed wild and antic geſtures. Prudentius repreſents them as cutting and ſlaſhing their arms with knives. Shaking the head was alſo common among the fanatici; for Lampridius informs us, that the emperor Heliogabulus was arrived to that pitch of madneſs, as to ſhake his head with the gaſhed fanatics. Hence the word was applied among us to the Anabaptiſts, Quakers, &c. at their firſt riſe, and is now an epithet given to the modern prophets, muggletonians, &c.

FANCY, or imagination. See IMAGINATION.

FANIONS, in the military art, ſmall flags carried along with the baggage.

FANSHAW (Sir Richard), famous for his embaſſies and writings, was the tenth and youngeſt ſon of Sir Henry Fanſhaw of Ware Park in Hertfordſhire, where it is ſuppoſed he was born about the year 1607. He diſtinguiſhed himſelf ſo early by his abilities, that in 1635 he was taken into government-employments by King Charles I. and ſent reſident to the court of Spain; whence being recalled in the beginning of the troubles in 1641, he adhered to the royal intereſt, and was employed in ſeveral important matters of ſtate. During his vacant hours he wrote divers poems, and made ſeveral tranſlations. At the reſtoration it was expected he would have been made one of the ſecretaries of ſtate: however, he was made maſter of the requeſts; a ſtation in thoſe times of conſiderable profit. Afterwards, on account of his ſkill in the Latin language, he was made ſecretary for that tongue. In 1661, he was ſent envoy to the king of Portugal. In 1662, he was again ſent to that court with the title of *ambaſſador*, and negociated the marriage of his maſter king Charles II. with the infanta Donna Catherina. Upon his return he was made one of the privy-council. In 1664, he was ſent ambaſſador to both the courts of Spain and Portugal; at which time the foundation of peace betwixt thoſe crowns and England was laid by him. His conduct during his former employments in thoſe courts gained him ſuch high eſteem there, that his reception was magnificent, exceeding all that were before, which thoſe kings declared was

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Fantaſia || Fare.

not to be a precedent to ſucceeding ambaſſadors. He died at Madrid in 1666, on the very day he had fixed for ſetting out on his return to England. Beſides ſome original poems, and others tranſlations, he publiſhed a tranſlation of Bathiſta Guarini's *Paſtor Fido*, and another of the *Luſiad* of Camoen's. Among his poſthumous publications are, "Letters during his embaſſies in Spain and Portugal; with his life prefixed."

FANTASIA, in the Italian muſic, ſignifies *fancy*; and is uſed for a compoſition, wherein the compoſer ties himſelf to no particular time, but ranges according as his fancy leads, amidſt various movements, different airs, &c. This is otherwiſe called the *capricious ſtyle*: before ſonatas were uſed, there were many of this kind, ſome of which remain even now.

FANUM, among the Romans, a temple or place conſecrated to ſome deity. The deified men and women among the heathens had likewiſe their *fana*; even the great philoſopher Cicero erected one to his daughter Tullia.

Fanum Vacunæ, (anc. geog.), a village of the Sabines, ſituated between Cures and Mandela; where ſtood the temple of Vacuna, goddeſs of the idle or unemployed, in an old decayed ſtate; and hence the epithet *putre*, uſed by Horace. Now called *Vocone*, in the Eccleſiaſtic State.

FARANDMAN, a traveller, or merchant ſtranger, to whom, by the laws of Scotland, juſtice ought to be done with all expedition, that his buſineſs or journey be not hindered.

FARCE, was originally a droll, petty ſhow, or entertainment, exhibited by charletans, and their buffoons, in the open ſtreet to gather the crowd together. —The word is French, and ſignifies literally, "forcemeat or ſtuffing." It was applied on this occaſion, no doubt, on account of the variety of jeſts, gibes, tricks, &c. wherewith the entertainment was interlarded. Some authors derive farce from the Latin *facetia*; others from the Celtic *farce*, "mockery;" others from the Latin *farcire*, "to ſtuff."

At preſent it is removed from the ſtreet to the theatre; and inſtead of being performed by merry-andrews to amuſe the rabble, is acted by comedians and becomes the entertainment of a polite audience. Poets have reformed the wildneſs of the primitive farces, and brought them to the taſte and manner of comedy. The difference between the two on our ſtage is, that comedy keeps to nature and probability, and therefore is confined to certain laws preſcribed by ancient critics; whereas farce diſallows of all laws, or rather ſets them aſide on occaſion. Its end is purely to make merry; and it ſticks at nothing which may contribute thereto, however wild and extravagant. Hence the dialogue is uſually low, the perſons of inferior rank, the fable or action trivial or ridiculous, and nature and truth every where heightened and exaggerated to afford the more palpable ridicule.

FARCIN, or FARCY, a diſeaſe in horſes, and ſometimes in oxen, &c. ſomewhat of the nature of a ſcabies or mange. See FARRIERY, ſect. xxiv.

FARDING-DEAL, the fourth part of an acre of land. See ACRE.

FARE, moſt commonly ſignifies the money paid for a voyage, or paſſage by water; but, in London, it is what perſons pay for being conveyed from one part of the town to another in a coach or chair.

Farewell-Cape || Farm.

FAREWELL-CAPE, the moſt ſouthern promontory of Greenland, in W. Long. 50°, and N. Lat. 60°.

FARIN, or FARM. See FARM.

FARINA, a Latin term ſignifying meal, or the flour of corn. See CORN.

Farina Fœcundans, among botaniſts, the ſuppoſed impregnating meal or duſt on the apices or antheræ of flowers. See POLLEN.

The manner of gathering the farina of plants for microſcopical obſervations is this: Gather the flowers in the midſt of a dry ſunſhiny day when the dew is perfectly off, then gently ſhake off the farina, or lightly bruſh it off with a ſoft hair-pencil, upon a piece of white paper; then take a ſingle talc or iſinglaſs between the nippers, and, breathing on it, apply it inſtantly to the farina, and the moiſture of the breath will make that light powder ſtick to it. If too great a quantity be found adhering to the talc, blow a little of it off; and, if there is too little, breathe upon it again, and take up more. When this is done, put the talc into the hole of a ſlider, and, applying it to the microſcope, ſee whether the little grains are laid as you deſire; and if they are, cover them up with another talc, and fix the ring; but be careful that the talcs do not preſs upon the farina in ſuch a manner as to alter its form.

FARLEU, money paid by the tenants in the weſt of England, in lieu of a heriot. In ſome manors of Devonſhire, farleu is often diſtinguiſhed to be the beſt goods, as heriot is the beſt beaſt, payable at the death of a tenant.

FARM, FARIN, or *Ferm*, *(Firma)*, in law, ſignifies a little country meſſuage or diſtrict; containing houſe and land, with other conveniencies; hired, or taken by leaſe, either in writing, or parole under a certain yearly rent. See LEASE.

This in divers parts is differently termed: in the north, it is a *tack*; in Lancaſhire, a *fermeholt*; in Eſſex, a *wike*, &c.

In the corrupted Latin, *firma* ſignified a place incloſed or ſhut in: whence, in ſome provinces, Menage obſerves, they call *cloſerie*, or *cloſure*, what in others they call a *farm*. Add, that we find *locare ad firmam*, to ſignify to let to *farm*; probably on account of the ſure hold the tenant here has in compariſon of tenants at will.

Spelman and Skinner, however, chooſe to derive the word *farm* from the Saxon *fearme*, or *feorme*, that is, *victus*, "proviſion;" by reaſon the country people and tenants anciently paid their rents in victuals and other neceſſaries, which were afterwards converted into the payment of a ſum of money. Whence a *farm* was originally a place that furniſhed its landlord with proviſions. And among the Normans they ſtill diſtinguiſh between farms that pay in kind, *i. e.* proviſions, and thoſe which pay in money; calling the former ſimply *fermes*, and the latter *blanche ferme*, "white ferm."

Spelman ſhows, that the word *firma*, anciently ſignified not only what we now call a *farm*, but alſo a feaſt or entertainment, which the farmer gave the proprietor or landlord, for a certain number of days, and

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Farm. at a certain rate, for the lands he held of him. Thus *fearme* in the laws of King Canute is rendered by Mr Lambard, *victus*: and thus we read of *reddere firmam unius noctis*, and *reddebat unum diem de firma*; which denote provision for a night and day, the rents about the time of the conquest being all paid in provisions; which custom is said to have been first altered under King Henry I. We also say *to farm* duties, imposts, &c.

Culture of a FARM. See AGRICULTURE.

FARM, as connected with gardening, and susceptible of embellishment. See GARDENING.

In speculation, it might have been expected that the first essays of improvement should have been on a farm, to make it both advantageous and delightful; but the fact was otherwise: a small plot was appropriated to pleasure; the rest was reserved for profit only. And this may, perhaps, have been a principal cause of the vicious taste which long prevailed in gardens. It was imagined that a spot set apart from the rest should not be like them: the conceit introduced deviations from nature, which were afterwards carried to such an excess, that hardly any objects truly rural were left within the enclosure, and the view of those without was generally excluded. The first step, therefore, towards a reformation, was by opening the garden to the country, and that immediately led to assimilating them; but still the idea of a spot appropriated to pleasure only prevailed, and one of the latest improvements has been to blend the useful with the agreeable; even the ornamental farm was prior in time to the more rural; and we have at last returned to simplicity by force of refinement.

Of a pastoral farm. 1. The ideas of pastoral poetry seem now to be the standard of that simplicity; and a place conformable to them is deemed a farm in its utmost purity. An allusion to them evidently enters into the design of the Leasowes (A), where they appear so lovely as to endear the memory of their author; and justify the reputation of Mr Shenstone, who inhabited, made, and celebrated the place: it is a perfect picture of his mind, simple, elegant, and amiable; and will always suggest a doubt, whether the spot inspired his verse, or whether, in the scenes which he formed, he only realized the pastoral images which abound in his songs. The whole is in the same taste, yet full of variety; and, except in two or three trifles, every part is rural and natural. It is literally a grazing farm lying round the house; and a walk, as unaffected and as unadorned as a common field-path, is conducted through the several enclosures. But for a detail of the plan and scenery, as illustrative of the present subject, the reader is referred to the particular description of the Leasowes published by the late Mr Dodsley. We shall only take notice of one or two circumstances independent on the general delineation.

The art with which the divisions between the fields are diversified is one of them. Even the hedges are distinguished from each other: a common quickset fence is in one place the separation; in another, it is a lofty hedge-row, thick from the top to the bottom; in a third, it is a continued range of trees, with all their stems clear, and the light appearing in the intervals between their boughs, and the bushes beneath them; in others, these lines of trees are broken, a few groupes only being left at different distances; and sometimes a wood, a grove, a coppice, or a thicket, is the apparent boundary, and by them both the shape and the style of the enclosures are varied. Farm.

The inscriptions, which abound in the place, are another striking peculiarity: they are well known and justly admired; and the elegance of the poetry, and the aptness of the quotations, atone for their length and their number. But, in general, inscriptions please no more than once: the utmost they can pretend to, except when their allusions are emblematical, is to point out the beauties, or describe the effects, of the spots they belong to; but those beauties and those effects must be very faint, which stand in need of the assistance. Inscriptions, however, to commemorate a departed friend, are evidently exempt from the censure; the monuments would be unintelligible without them; and an urn, in a lonely grove, or in the midst of a field, is a favourite embellishment at the Leasowes: they are indeed among the principal ornaments of the place; for the buildings are mostly mere seats, or little roothouses; a ruin of a priory is the largest, and that has no peculiar beauty to recommend it: but a multiplicity of objects are unnecessary in the farm; the country it commands is full of them; and every natural advantage of the place within itself has been discovered, applied, contrasted, and carried to the utmost perfection, in the purest taste, and with inexhaustible fancy.

Among the ideas of pastoral poetry which are here introduced, its mythology is not omitted: but the allusions are both to ancient and to modern fables; sometimes to the fairies; and sometimes to the naiads and muses. The objects also are borrowed partly from the scenes which this country exhibited some centuries ago, and partly from those of Arcadia: the priory, and a Gothic seat, still more particularly characterised by an inscription in obsolete language and the black letter, belong to the one; the urns, Virgil's obelisk, and a rustic temple of Pan, to the other. All these allusions and objects are indeed equally rural: but the images in an English and a classical eclogue are not the same; each species is a distinct imitative character. Either is proper; either will raise the farm it is applied to above the ordinary level; and within the compass of the same place both may be introduced; but they should be separate: when they are mixed, they counteract one another; and no representation is produced of the times and the countries they refer to. A certain district should therefore be allotted to each, that all the fields which belong to the respective characters may lie together, and the corresponding ideas be preserved for a continuance.

2. In such an assortment, the more open and polished scenes will generally be given to the Arcadian shepherd; and those in a lower degree of cultivation, will be thought more conformable to the manners of the ancient British yeomanry. We do not conceive that the Of an ancient farm.

(A) In Shropshire, between Birmingham and Stourbridge.

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Farm. the country in their time was entirely cleared, or diſtinctly divided; the fields were ſurrounded by woods, not by hedges; and if a conſiderable tract of improved land lay together, it ſtill was not ſeparated into a number of incloſures. The ſubjects, therefore, proper to receive this character, are thoſe in which cultivation ſeems to have encroached on the wild, not to have ſubdued it; as the bottom of a valley in corn, while the ſides are ſtill overgrown with wood; and the outline of that wood indented by the tillage creeping more or leſs up the hill. But a glade of graſs, thus circumſtanced, does not peculiarly belong to the ſpecies: that may occur in a park or paſtoral farm; in this, the paſtures ſhould rather border on a waſte or a common: if large, they may be broken by ſtraggling buſhes, thickets, or coppices; and the ſcattered trees ſhould be beſet with brambles and briars. All theſe are circumſtances which improve the beauty of the place; yet appear to be only remains of the wild, not intended for embelliſhment. Such interruptions muſt, however, be leſs frequent in the arable parts of the farm; but there the opening may be divided into ſeveral lands, diſtinguiſhed, as in common fields, only by different ſorts of grain. Theſe will ſufficiently break the ſameneſs of the ſpace; and tillage does not furniſh a more pleaſing ſcene, than ſuch a ſpace ſo broken, if the extent be moderate, and the boundary beautiful.

As much wood is eſſential to the character, a ſpot may eaſily be found, where turrets riſing above the covert, or ſome arches ſeen within it, may have the reſemblance of a caſtle or an abbey. The partial concealment is almoſt neceſſary to both; for to accord with the age, the buildings muſt ſeem to be entire; the ruins of them belong to later days: the diſguiſe is, however, advantageous to them as objects; none can be imagined more picturesque, than a tower boſomed in trees, or a cluſter appearing between the ſtems and the branches. But the ſuperſtitions of the times furniſh other objects which are more within compaſs: hermitages were then real; ſolitary chapels were common; many of the ſprings of the country being deemed holy wells, were diſtinguiſhed by little Gothic domes built over them; and every hamlet had its croſs; even this, when perfect, ſet on a little ruſtic pillar, and that raiſed upon a baſe of circular ſteps, may in ſome ſcenes be conſiderable: if a ſituation can be found for a Maypole, whence it would not obtrude itſelf on every view, that alſo might not be improper; and an ancient church, however unwelcome it may be when it breaks into the deſign of a park or a garden, in ſuch a farm as this would be a fortunate accident: nor would the old yew in the church-yard be indifferent; it would be a memorial of the times when it was uſeful.

Many other objects, ſignificant of the manners of our anceſtors, might perhaps, upon recollection, occur; but theſe are amply ſufficient for a place of conſiderable extent; and cottages muſt abound in every age and every country; they may therefore be introduced in different forms and poſitions. Large pieces of water are alſo particularly proper; and all the varieties of riſls are conſiſtent with every ſpecies of farm. From the concurrence of ſo many agreeable circumſtances in this, be the force or the effect of the character what it may, a number of pleaſing ſcenes may be exhibited either in a walk or riding, to be contraſted to thoſe which in another part of the place may be formed on Arcadian ideas; or even to be ſubſtituted in their ſtead, if they are omitted. Farm.

3. A part may alſo be free from either of theſe imitative characters, and laid out in a common ſimple farm. Some of the greateſt beauties of nature are to be found in the fields, and attend an ordinary ſtate of cultivation: wood and water may there be exhibited in ſeveral forms and diſpoſitions; we may enlarge or divide the incloſures; and give them ſuch ſhapes and boundaries as we pleaſe; every one may be an agreeable ſpot; together, they may compoſe beautiful views; the arable, the paſture, and the mead, may ſucceed one another; and now and then a little wild may be intermixed without impropriety; every beauty, in ſhort, which is not unuſual in an incloſed country, whether it ariſe from neglect or improvement, is here in its place. Of a ſimple farm.

The buildings, alſo, which are frequent in ſuch a country, are often beautiful objects; the church and the manſion are conſiderable; the farm-yard itſelf, if an advantageous ſituation be choſen for it; if the ricks, and the barns, and the out-houſes, are ranged with any deſign to form them into groupes, and if they are properly blended with trees; may be made a picturesque compoſition. Many of them may be detached from the groupe, and diſperſed about the grounds: the dove-cote, or the diary, may be ſeparated from the reſt; they may be elegant in their forms, and placed wherever they will have the beſt effect. A common barn, accompanied by a clump, is ſometimes pleaſing at a diſtance; a Dutch barn is ſo when near; and an hay-ſtack is generally an agreeable circumſtance in any poſition. Each of theſe may be ſingle; and beſides theſe, all kinds of cottages are proper. Among ſo many buildings, ſome may be converted to other purpoſes than their conſtruction denotes; and, whatever be their exterior, may within be made agreeable retreats, for refreſhment, indulgence, or ſhelter.

With ſuch opportunities of improvement, even to decoration within itſelf, and with advantages of proſpect into the country about it, a ſimple farm may undoubtedly be delightful. It will be particularly acceptable to the owner, if it be cloſe to his park or his garden: the objects which conſtantly remind him of his rank, impoſe a kind of conſtraint; and he feels himſelf relieved, by retiring ſometimes from the ſplendor of a ſeat into the ſimplicity of a farm: it is more than a variety of ſcene; it is a temporary change of ſituation in life, which has all the charms of novelty, eaſe, and tranquillity, to recommend it. A place, therefore, can hardly be deemed perfect, which is not provided with ſuch a retreat. But if it be the whole of the place, it ſeems inadequate to the manſion: a viſitor is diſappointed; the maſter is diſſatisfied; he is not ſufficiently diſtinguiſhed from his tenants; he miſſes the appendages incidental to his ſeat and his fortune; and is hurt at the ſimilarity of his grounds with the country about them. A paſtoral or an ancient farm is a little above the common level; but even theſe, if brought cloſe up at the door, ſet the houſe in a field, where it always appears to be neglected and naked. Some degree of poliſh and ornament is expected in its immediate environs; and a garden, though it be but a ſmall one, ſhould be interpoſed between the manſion and any ſpecies of farm.

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Farm. Of an ornamented farm.

4. A ſenſe of the propriety of ſuch improvements about a ſeat, joined to a taſte for the more ſimple delights of the country, probably ſuggeſted the idea of an *ornamented farm*, as the means of bringing every rural circumſtance within the verge of a garden. This idea has been partially executed very often; but no where, perhaps, ſo completely, and to ſuch an extent, as at Woburn farm, (near Weybridge in Surry.) The place contains 150 acres: of which near 35 are adorned to the higheſt degree; of the reſt, about two thirds are in paſture, and the remainder is in tillage. The decorations are, however, communicated to every part: for they are diſpoſed along the ſides of a walk, which, with its appendages, forms a broad belt round the grazing-grounds; and is continued, though on a more contracted ſcale, through the arable. This walk is properly garden; all within it is farm; the whole lies on the two ſides of a hill, and on a flat at the foot of it: the flat is divided into corn-fields; the paſtures occupy the hill; they are ſurrounded by the walk, and croſſed by a communication carried along the brow, which is alſo richly dreſſed, and which divides them into two lawns, each completely encompaſſed with garden.

Theſe are in themſelves delightful; the ground in both lies beautifully; they are diverſified with clumps and ſingle trees; and the buildings in the walk ſeem to belong to them. On the top of the hill is a large octagon ſtructure; and, not far from it, the ruin of a chapel. To one of the lawns the ruin appears, on the brow of a gentle aſcent, backed and grouped with wood; from the other is ſeen the octagon, upon the edge of a ſteep fall, and by the ſide of a pretty grove, which hangs down the declivity. This lawn is further embelliſhed by a neat Gothic building; the former by the houſe, and the lodge at the entrance; and in both, other objects of leſs conſequence, little ſeats, alcoves, and bridges, continually occur.

The buildings are not, however, the only ornaments of the walk; it is ſhut out from the country, for a conſiderable length of the way, by a thick and loſty hedge-row, which is enriched with woodbine, jeſſamine, and every odoriferous plant whoſe tendrils will entwine with the thicket. A path, generally of ſand or gravel, is conducted in a waving line, ſometimes cloſe under the hedge, ſometimes at a little diſtance from it; and the turf on either hand is diverſified with little groupes of ſhrubs, of firs, or the ſmalleſt trees, and often with beds of flowers: theſe are rather too profuſely ſtrewed, and hurt the eye by their littleneſſes; but then they repleniſh the air with their perfumes, and every gale is full of fragrancy. In ſome parts, however, the decoration is more chaſte; and the walk is carried between larger clumps of evergreens, thickets of deciduous ſhrubs, or ſtill more conſiderably open plantations. In one place it is entirely ſimple, without any appendages, any gravel, or any ſunk fence to ſeparate it from the lawn; and is diſtinguiſhed only by the richneſs of its verdure, and the nicety of its preſervation. In the arable part it is alſo of green ſward, following the direction of the hedges about the ſeveral incloſures: theſe hedges are ſometimes thickened with flowering ſhrubs; and in every corner or vacant ſpace, is a roſary, a cloſe or an open clump, or a bed of flowers: but if the parterre has been rifled for the embelliſhment of the fields, the country has on the other hand been ſearched for plants new in a garden; and the ſhrubs and the flowers which uſed to be deemed peculiar to the one, have been liberally transferred to the other; while their number ſeems multiplied by their arrangement in ſo many and ſuch different diſpoſitions. A more moderate uſe of them would, however, have been better; and the variety more pleaſing, had it been leſs licentious.

Farm ‖ Farm.

But the exceſs is only in the borders of the walk; the ſcenes through which it leads are truly elegant, every where rich, and always agreeable. A peculiar cheerfulneſs overſpreads both the lawns, ariſing from the number and the ſplendor of the objects with which they abound, the lightneſs of the buildings, the inequalities of the ground, and the varieties of the plantations. The clumps and the groves, though ſeparately ſmall, are often maſſed by the perſpective, and gathered into conſiderable groups, which are beautiful in their forms, their tints, and their poſitions. The brow of the hill commands two lovely proſpects: the one gay and extenſive, over a fertile plain, watered by the Thames, and broken by St Anne's Hill and Windſor Caſtle; a large mead, of the moſt luxuriant verdure, lies juſt below the eye, ſpreading to the banks of the river; and beyond it the country is full of farms, villas, and villages, and every mark of opulence and cultivation. The other view is more wooded: the ſteeple of a church, or the turrets of a ſeat, ſometimes riſe above the trees; and the bold arch of Walton Bridge is there a conſpicuous object, equally ſingular and noble. The incloſures on the flat are more retired and quiet; each is confined within itſelf; and all together they form an agreeable contraſt to the open expoſure above them.

With the beauties which enliven a garden are every where intermixed many properties of a farm: both the lawns are paſtured; and the lowings of the herds, the bleating of the ſheep, and the tinklings of the bell-wedder, reſound through all the plantations: even the clucking of poultry is not omitted; for a menagerie of a very ſimple deſign is placed near the Gothic building; a ſmall ſerpentine river is provided for the water-fowl; while the others ſtray among the flowering ſhrubs on the banks, or ſtraggle about the neighbouring lawn: and the corn-fields are the ſubjects of every rural employment which arable land from ſeed-time to harveſt can furniſh. But though ſo many of the circumſtances occur, the ſimplicity of a farm is wanting; that idea is loſt in ſuch a profuſion of ornament; a ruſticity of character cannot be preſerved amidſt all the elegant decorations which may be laviſhed on a garden.

FARMER, he that tenants a farm, or is leſſee thereof. Alſo generally every leſſee for life, years, or at will, is called *farmer*. As this word implies no myſtery, except it be that of huſbandry, huſbandman is the proper addition for a farmer.

Farmer, in mining, is the lord of the field, or one that farms the lot and cope of the king.

FARN ISLANDS, two groups of little iſlands and rocks, 17 in number, lying oppoſite to Bamborough caſtle in Northumberland. At low water the points of ſeveral others are viſible beſides the 17 juſt mentioned,

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Farn || Farnham.

ed. The nearest island to the shore is called the *Houseisland*, and lies exactly one mile and 68 chains from the coast. The most distant is about seven or eight miles. Their produce is kelp, feathers, and a few seals, which the tenant watches and shoots for the sake of the oil and skins. Some of them yield a little grass that may serve to feed a cow or two; which the people transport over in their little boats. The largest or House island is about one mile in compass, and has a fort and a lighthouse. It contains about six or seven acres of rich pasture; and the shore abounds with good coals which are dug at the ebb of tide. St Cuthbert is said to have passed the two last years of his life on this island. A priory of Benedictines was afterwards established here, for six or eight monks, subordinate to Durham. A square tower, the remains of a church, and some other buildings, are still to be seen on this island; and a stone coffin, which is pretended to be that of St Cuthbert. At the north end of the isle is a deep chasm, from the top to the bottom of the rock, communicating with the sea; through which, in tempestuous weather, the water is forced with great violence and noise, and forms a fine jet d'eau of 60 feet high. It is called by the inhabitants of the opposite coast, the *Churn*. One of the islands in the most distant groupe is called the *Pinnacles*, from some vast columnar rocks at the south end, even at their sides, flat at the tops, and entirely covered with guillemots and shags. The fowlers pass from one to the other of these columns by means of a board, which they place from top to top, forming a narrow bridge over such a dreadful gap that the very sight of it strikes one with horror.

FARNABIE (Thomas), son of a carpenter at London, born in 1575, staid a short while at Oxford; where being enticed to abandon his religion, he went to Spain, and was there educated in a college belonging to the Jesuits. Being weary of their severe discipline, he went with Sir John Hawkins and Sir Francis Drake in their last voyage in 1595. He was afterwards a soldier in the Low Countries: but being reduced to great want, returned to England, where wandering about for some time under the name of *Thomas Bainrafe*, the anagram of his name, he settled at Mattock in Somersetshire, and taught a grammar-school with good reputation. He removed to London, and opened a school with large accommodations for young gentlemen. While he taught this school, he was made master of arts at Cambridge, and incorporated into the university of Oxford. Thence he removed, in 1636, to Seven-oaks in Kent; and taught the sons of several noblemen and gentlemen, who boarded with him, with great success, and grew rich. His works gained him reputation. Upon the breaking out of the civil commotions in 1641, he was cast into prison. It was debated in the house of commons, whether he should be sent to America; but this motion being rejected, he was removed to Ely-house in Holborn, and there he died in 1647. Mr Farnabie was a very eminent grammarian; and many writers have spoken with great approbation of his labours. M. Bayle in particular says, "His notes upon most of the ancient Latin poets have been of very great use to young beginners; being short, learned, and designed chiefly to clear up the text."

FARNHAM, or FERNHAM; a town of Surry, and capital of the hamlet of its own name, 41 miles from London on the Winchester road. It is a large populous place, situated on the river Wey, and supposed to have its name from the fern which abounded here. It was given by the West Saxon king Ethelbald to the see of Winchester; the bishops of which have generally resided in the castle here, in the summer time, ever since the reign of king Stephen, whose brother, its then bishop, first built it. It was a magnificent structure, with deep moats, strong walls and towers at proper distances, and a fine park; but it is much decayed. The town, which has many handsome houses, and well paved streets, is governed by 12 masters or burgesses, of whom two are bailiffs, (chosen annually). They have the profit of the fairs and markets, and the assize of bread and beer; and hold a court every three weeks, which has power of trying and determining all actions under 40s. From Michaelmas to Christmas here is a good market for oats; and one of the greatest wheat markets in England, especially between All-Saints day and midsummer. The toll-dish here was once reckoned worth 200l. a-year; but it is much diminished, since the people about Chichester and Southampton began to send their meal to London by sea. But this loss is amply made up by the vast growth of hops here, of which there are 300 or 400 acres of plantations about this town, and they are said to outdo the Kentish hop-yards both in quantity and quality. This town sent members to parliament in the reign of Edward II. but never since. The magistrates have their privileges from the bishop of Winchester, to whom they pay an acknowledgment of 12d. a-year. The market is on Thursday: fairs, Holy Thursday, June 24. and November 2. Here are a free school, and a great market for Welsh hose.

Farnham || Farquhar.

FARNOVIANS, in ecclesiastical history, a sect of Socinians, so called from Stanislaus Farnovius, who separated from the other Unitarians in the year 1568, and was followed by several persons eminent for their learning. This sect did not last long; for having lost their chief, who died in 1615, it was scattered abroad and reduced to nothing. Farnovius was engaged by Gonesius to prefer the Arian system to that of the Socinians, and consequently asserted, that Christ had been produced out of nothing by the Supreme Being before the creation of this terrestrial globe. His sentiments concerning the Holy Ghost are not certainly known; however, it appears that he warned his disciples against paying the tribute of religious worship to the Divine Spirit.

FARQUHAR (George), an ingenious poet and dramatic writer, the son of a clergyman in Ireland, was born at Londonderry in 1678. He was sent to Trinity College, Dublin; but his volatile disposition not relishing a college life, he betook himself to the stage; where, having dangerously wounded a brother-actor in a tragic scene, by forgetting to change his sword for a foil, it shocked him so much that he left the Dublin theatre and went to London. Here he procured a lieutenant's commission by the interest of the earl of Orrery; which he held several years, and gave many proofs both of courage and conduct. In 1698, he wrote his first comedy called *Love and a Bottle*; which, for its sprightly dialogue and busy scenes, was well received. In the beginning of the year 1700, which was the

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Farquhar. the jubilee year at Rome, he brought out his *Conſtant Couple, or a Trip to the Jubilee:* and ſuited Mr Wilks's talents ſo well in the character of Sir Harry Wildair, that the player gained almoſt as much reputation as the poet. This tempted him to continue it in another comedy called *Sir Harry Wildair*, or *The ſequel of the Trip to the Jubilee;* in which Mrs Oldfield acquired great applauſe. In 1702, he publiſhed his Miſcellanies, which contain a variety of humorous ſallies of fancy. In 1703, appeared the *Inconſtant*, or *the Way to win him;* in 1704, a farce called the *Stage-coath;* in 1705, *The Twin Rivals;* and in 1706, the *Recruiting Officer*, founded on his own obſervations while on a recruiting party at Shrewſbury. His laſt comedy was the *Beaux Stratagem*, of which he did not live to enjoy the full ſucceſs. Mr Farquhar married in 1703. Before that time his manner of life had been rather diſſipated. The lady therefore, who afterwards became his wife, having fallen violently in love with him, but judging that a gentleman of his humour would not eaſily be drawn into the trammels of matrimony, contrived to have it given out that ſhe was poſſeſſed of a large fortune; and finding means afterwards to let Mr Farquhar know her attachment to him, intereſt and vanity got the better of his paſſion for liberty, and the lady and he were united in the hymeneal bands. But how great was his diſappointment, when he found all his proſpects overclouded ſo early in life (for he was then no more than 24), by a marriage from which he had nothing to expect but an annual increaſe of family, and an enlargement of expence in conſequence of it far beyond what his income would ſupport. Yet, to his honour be it told, though he found himſelf thus deceived in a moſt eſſential particular, he never was known once to upbraid his wife with it; but generouſly forgave an impoſition which love for him alone had urged her to, and even behaved to her with all the tenderneſs and delicacy of the moſt indulgent huſband. Mrs Farquhar, however, did not very long enjoy the happineſs ſhe had purchaſed by this ſtratagem; for the circumſtances that attended this union were in ſome reſpect perhaps the means of ſhortening the period of the captain's life. For, finding himſelf conſiderably involved in debt in conſequence of their increaſing family, he was induced to make application to a certain noble courtier, who had frequently profeſſed the greateſt friendſhip for him, and given him the ſtrongeſt aſſurances of his intended ſervices. This pretended patron repeated his former declarations; but, expreſſing much concern that he had nothing at preſent immediately in his power, adviſed him to convert his commiſſion into money to anſwer his preſent occaſions, and aſſured him that in a ſhort time he would procure another for him. Farquhar, who could not bear the thoughts of his wife and family being in diſtreſs, followed this advice, and ſold his commiſſion; but, to his great mortification and diſappointment, found, on a renewal of his application to this inhuman nobleman, that he had either entirely forgotten, or had never intended to perform, the promiſe he had made him. This diſtracting fruſtration of all his hopes fixed itſelf ſo ſtrongly on our author's mind, that it ſoon brought on him a ſure, tho' not a very ſudden, declenſion of nature, which at length carried him off the ſtage of life in 1707, before he arrived at 30 years of age.—His comedies are ſo diverting, and the characters ſo natural, that his plays ſtill continue to be repreſented to full houſes. Farrier.

FARRIER, one whoſe employment is to ſhoe horſes, and cure them when diſeaſed or lame.

FARRIERY,

THE art of preventing, curing, or palliating, the diſeaſes of horſes.

The practice of this uſeful art has been hitherto almoſt entirely confined to a ſet of men who are totally ignorant of anatomy and the general principles of medicine. It is not therefore ſurpriſing, that their preſcriptions ſhould be equally abſurd as the reaſons they give for adminiſtering them. It cannot indeed be expected that farriers, who are almoſt univerſally illiterate men, ſhould make any real progreſs in their profeſſion. They preſcribe draughts, they rowel, cauteriſe, &c. without being able to give any other reaſon for their practice, but becauſe their fathers did ſo before them. How can ſuch men deduce the cauſe of a diſeaſe from its ſymptoms, or form a rational method of cure, when they are equally ignorant of the cauſes of diſeaſes and the operation of medicines?

The miſerable ſtate of this uſeful art has determined us to ſelect, from the beſt authors, ſuch a ſyſtem of practice as ſeems to be formed on rational principles; this, we hope, will be a ſufficient apology for being ſo full upon this article.

Sect. I. *General Directions with regard to the Management of Horſes.*

1. It ought to be laid down as a general rule, to give horſes as few medicines as poſſible; and by no means to comply with the ridiculous cuſtom of ſome, who are frequently bleeding, purging, and giving balls, though their horſes be in perfect health, and have no indication that requires ſuch treatment.

2. Proper management in their feeding, exerciſe, and dreſſing, will alone cure many diſorders, and prevent moſt; for the ſimplicity of a horſe's diet, which chiefly conſiſts of grain and herbage, when good in kind, and diſpenſed with judgment, ſecures him from theſe complicated diſorders which are the general effects of intemperance in the human body.

3. In France, Germany, and Denmark, horſes are ſeldom purged; there they depend much on alteratives; the uſe of the liver of antimony we have from the French, which is in general a good medicine for that purpoſe, and may, in many caſes, be ſubſtituted in the room of purging.

4. As hay is ſo material an article in a horſe's diet, great care ſhould be taken to procure the beſt: when it is not extraordinary, the duſt ſhould be well ſhook out before it is put in the rack; for ſuch hay is very apt to breed vermin.

5. Beans afford the ſtrongeſt nouriſhment of all grain; but are fitteſt for laborious horſes, except on particular occaſions. In ſome ſeaſons they breed a kind of vermin called the *red bugs*, which is thought to be dangerous;

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Management of horſes.

gerous; the beſt method in ſuch a caſe is to procure them well dried and ſplit.

6. Bran ſcalded is a kind of panada to a ſick horſe: but nothing is worſe than a too frequent uſe of it, either dry or ſcalded; for it relaxes and weakens the bowels too much. The botts in young horſes may be owing to too much muſty bran and chaff, given with other foul food to make them up for ſale; particular care therefore ſhould be taken that the bran be always ſweet and new.

7. Oats, well ripened, make a more hearty and durable diet than barley, and are much better ſuited to the conſtitutions of Britiſh horſes. A proper quantity of cut ſtraw and hay mixed with them, is ſometimes very uſeful to horſes troubled with botts, indigeſtion, &c.

8. Horſes who eat their litter, ſhould particularly have cut ſtraw and powdered chalk given them with their feed; as it is a ſign of a depraved ſtomach, which wants correcting.

9. The ſalt marſhes are good paſture for horſes who have been ſurfeited, and indeed for many other diſorders: they purge more by dung and urine than any other paſture, and make afterwards a firmer fleſh; their water is for the moſt part brackiſh, and of courſe, as well as the graſs, ſaturated with ſalts from the ſea-water.

10. A ſummer's graſs is often neceſſary; more particularly to horſes glutted with food, and which uſe little exerciſe: but a month or two's running is proper for moſt; thoſe eſpecially who have been worked hard, and have ſtiff limbs, ſwelled legs, or wind-galls. Horſes whoſe feet have been impaired by quittors, bad ſhoeing, or any other accidents, are alſo beſt repaired at graſs. Thoſe lameneſſes particularly require turning out to graſs, where the muſcles or tendons are contracted or ſhrunk; for by the continual gentle exerciſe in the field, with the aſſiſtance of a pattin-ſhoe on the oppoſite foot, the ſhortened limb is kept on the ſtretch, the waſted parts are reſtored to their ordinary dimenſions, and the limb again recovers its uſual tone and ſtrength.

11. The fields which lie near great towns and are much dunged, are not proper paſture for horſes; but on obſervation appear very injurious to them, if they feed thereon all the ſummer.

12. Horſes may be kept abroad all the year, where they have a proper ſtable or ſhed to ſhelter them from the weather, and hay at all times to come to. So treated, they are ſeldom ſick; their limbs are always clean and dry; and, with the allowance of corn, will hunt, and do more buſineſs than horſes kept conſtantly within doors.

13. If horſes, when taken from graſs, ſhould grow hot and coſtive, mix bran and chopt hay with their corn; and give them ſometimes a feed of ſcalded bran for a fortnight, or longer: let their exerciſe and diet be moderate for ſome time, and increaſe both by degrees.

14. When horſes are ſoiled in the ſtable, care ſhould be taken that the herbage is young, tender, and full of ſap; whether it be green barley, tares, clover, or any thing elſe the ſeaſon produces; and that it be cut freſh once every day at leaſt, if not oftener.

15. When horſes loſe their fleſh much in ſoiling, they ſhould in time be taken to a more ſolid diet: for it is not in ſoiling as in grazing; where, though a horſe loſes his fleſh at firſt, yet after the graſs has purged him, he ſoon grows fat.

Blood-letting.

16. Young horſes, who have not done growing, muſt be indulged more in their feeding than thoſe come to their maturity; but if their exerciſe is ſo little as to make it neceſſary to abridge their allowance of hay, a little freſh ſtraw ſhould conſtantly be put in their racks to prevent their nibbling the manger, and turning crib-biters; they ſhould alſo be ſometimes ſtrapped back in order to cure them of this habit.

17. It is obvious to every one, what care ſhould be taken of a horſe after violent exerciſe, that he cool not too faſt, and drink no cold water, &c. for which reaſon we ſhall wave particular directions.

18. Moſt horſes fed for ſale have the interſtices of their muſcles ſo filled with fat, that their true ſhapes are hardly known. For which reaſon a horſe juſt come out of the dealer's hands ſhould at firſt be gently uſed. He ought to loſe blood, and have his diet lowered, though not too much: walking exerciſe is moſt proper at firſt, two hours in the day; in a week or fortnight two hours at a time, twice a-day; after this uſage for a month, bleed him again, and give him two or three times a-week ſcalded bran, which will prepare him for purging phyſic, that may now be given ſafely, and repeated at the uſual intervals.

19. When a horſe comes out of a dealer's hands, his cloathing muſt be abated by degrees, and care taken to put him in a moderately warm ſtable; otherwiſe the ſudden tranſition would be attended with the worſt conſequences.

SECT. II. *Of Blood-letting.*

1. HORSES who ſtand much in ſtable, and are full fed, require bleeding now and then; eſpecially when their eyes look heavy, dull, red, and inflamed; as alſo, when they feel hotter than uſual, and mangle their hay.

Young horſes ſhould be bled when they are ſhedding their teeth, as it takes off thoſe feveriſh heats they are then ſubject to. But the caſes that chiefly require bleeding, are colds, fevers of moſt kinds, falls, bruiſes, hurts of the eyes, ſtrains, and all inflammatory diſorders, &c.

It is right to bleed a horſe when he begins to grow fleſhy at graſs, or at any other time when he looks heavy: and it is generally proper to bleed before purging.

Let your horſe always be bled by meaſure, that you may know what quantity you take away: two or three quarts are always enough at one time; when you repeat it, allow for the diſorder and the horſe's conſtitution.

Although the operation of blood-letting is generally thought to be pretty well known, yet there are many untoward accidents that frequently happen from the unſkilful and unexperienced in performing it. The following directions and cautions on this head are extracted from Mr *Clark's Treatiſe on the Prevention of Diſeaſes incidental to Horſes.*

As horſes are naturally timorous and fearful, which is too frequently increaſed by bad uſage and improper chaſtiſement, they require in ſome caſes, particularly in this of bleeding, to be taken unawares or by ſurpriſe,

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Blood-letting.

priſe, and the orifice made into the vein before their fears are alarmed. For this reaſon, the fleam and blood-ſtick, as it is called, have been long in uſe, and in ſkilful hands are not improper inſtruments for the purpoſe; although with many practitioners the ſpring-fleam would be much ſafer, and on that account ought to be preferred. When a lancet is uſed, the inſtant the horſe feels the point of it, he raiſes or ſhakes his head and neck, in order to ſhun the inſtrument before the operator has time to make a proper orifice, which frequently proves too ſmall or too large; for this reaſon, thoſe who have tried the lancet have been obliged to lay it aſide.

Many perſons tie a ligature or bandage round the neck, in order to raiſe the vein, and that they may ſtrike the fleam into it with the greater certainty; but a ſlight view of its effects in preventing this, and its other conſequences, will ſhow the impropriety of the practice.

When a ligature is tied round the neck previous to bleeding in the jugular veins, it is to be obſerved, that it ſtops the circulation in both veins at the ſame time; hence they become turgid and very full of blood, inſomuch that they feel under the finger like a tight cord; and as the parts around them are looſe and ſoft, when the ſtroke is given to the fleam, the vein by its hardneſs or tightneſs ſlips to one ſide, of courſe it eludes the ſtroke; hence a deep wound is made by the fleam to no purpoſe, and this is ſometimes too frequently repeated. Unſkilful people have likewiſe a cuſtom of waving or ſhaking the blood-ſtick before they ſtrike the fleam in view of the horſe, whoſe eye is fixed on that inſtrument; and when they intend to give the ſtroke, they make a greater exertion: hence the horſe being alarmed by its motion, raiſes his head and neck, and a diſappointment follows. The ſtruggle that enſues by this means prolongs the operation; the ligature at the ſame time being ſtill continued round the neck, a total ſtagnation of the blood in the veſſels of the head takes place; and hence it frequently happens, that the horſe falls down in an apoplectic fit. In ſuch caſes the operator being diſconcerted, generally deſiſts from any farther attempts to draw blood at that time, under the idea that the horſe was vicious and unruly, although the very treatment the horſe had juſt undergone rendered bleeding at this time the more neceſſary, in order to make a ſpeedy revulſion from the veſſels of the head. Therefore, a ligature or bandage ought never to be uſed till ſuch time as the opening is made into the vein; and even then it will not be neceſſary at all times if the horſe can ſtand on his feet, as a moderate preſſure with the finger on the vein will make the blood flow freely; but if the horſe is lying on the ground, a ligature will be neceſſary.

But farther, the concuſſion or ſhock the horſe receives from his falling down in the above ſituation, which will always happen if the ligature is too long continued, may cauſe a blood-veſſel within the head to burſt, and death may be the conſequence.

Another cuſtom equally abſurd is allowing the blood to fall in a dunghill amongſt ſtraw, in dry ſand, or in dry duſt, by which means no diſtinct idea can be formed of the quantity that is or ought to be taken away. In ſuch caſes horſes have fallen down in a faint from the loſs of too much blood, before the operator thought of ſtopping up the orifice. For this and a variety of other reaſons which might be mentioned, a meaſure, as above obſerved, ought always to be uſed, in order to aſcertain the quantity of blood that is taken away.

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In pinning up the orifice, ſome have a cuſtom of raiſing or drawing out the ſkin too far from the vein; hence the blood flows from the orifice in the vein into the cellular ſubſtance between it and the ſkin, which cauſes a large lump or ſwelling to take place immediately: this frequently ends in what is called a *ſwelled neck*; a ſuppuration follows, which proves both tedious and troubleſome to cure. In caſes where a horſe may be tied up to the rack after bleeding in the neck, pinning up the external orifice may be diſpenſed with; but when a horſe is troubled with the gripes or any other acute diſeaſe, in which he lies down and tumbles about, it is neceſſary that the orifice be pinned up with care, in order to prevent the loſs of too much blood.

As the neck or jugular vein on the near ſide is commonly opened for conveniency by thoſe who are right-handed, the young practitioner ſhould learn to perform on both ſides of the neck. This he will find in practice to be not only uſeful but neceſſary, as he may frequently have occaſion to draw blood from horſes in very aukward ſituations; he will likewiſe find his account in it in a variety of caſes, which it is needleſs here to particularize.

The proper place for making the opening in the neck or jugular vein is likewiſe neceſſary to be attended to: for when the orifice is made too low, or about the middle of the neck, where the vein lies deep under the muſcular teguments, the wound becomes difficult to heal, and frequently ends in a ſuppuration, with a jetting out of proud fleſh from the orifice; which, unluckily, is as unſkilfully treated in the common method of cure, *viz.* by introducing a large piece of corroſive ſublimate into the wound: this not only deſtroys the proud fleſh in the lips of the wound, but a conſiderable portion of the fleſh around it; and in farriery it is called *coreing out the vein*. It frequently happens, that this corroſive application deſtroys the vein likewiſe; and ſometimes violent hemorrhagies follow, ſo as to endanger the life of the animal.

The moſt proper place for making the opening in the jugular veins is where the teguments are thinneſt, which is about a hand-breadth from the head, and about one inch below the branching or joining of the vein which comes from the lower jaw, and which may be diſtinctly ſeen when any preſſure is made on the main branch of the vein.

In performing the operation with a fleam, the operator ſhould hold the fleam between the fore-finger and thumb of the left hand; with the ſecond finger he is to make a ſlight preſſure on the vein, and before it becomes too turgid or full make the opening; the ſame degree of preſſure is to be continued on the vein, till ſuch time as the quantity of blood to be taken away is received into a proper meaſure.

Another great error, which generally prevails in opening the veins with a fleam, is the applying too great force, or giving too violent a ſtroke to it, by which it is forced through the oppoſite ſide of the vein: hence there is danger of wounding the coats of the arteries, as they generally lie under the veins; or, in ſome particular places, of wounding the tendons, eſpecially when this

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Blood-letting.

this operation is performed in the legs, thighs, &c. or in the veins, commonly called the *plate veins*, under the breaſt, the conſequences are frequently very troubleſome to remove, and in ſome caſes prove fatal. Mr Gibſon, in his Treatiſe on the Diſeaſes of Horſes, mentions a caſe of a fine horſe that was blooded in the plate veins for a lameneſs of the ſhoulder, which was followed with a hard oval ſwelling about the ſize of a gooſe egg, which extended upwards on the breaſt, and likewiſe down the leg, attended with exceſſive pain, fever, deadneſs in the horſe's looks, and all the other ſymptoms of a beginning mortification.

In order to avoid the conſequences ſometimes attending theſe local operations in the breaſt, legs, &c. and as horſes are more or leſs troubleſome and reſtleſs, whereby accidents of this kind may happen, it will perhaps be adviſeable, in moſt caſes of lameneſs, &c. to draw blood from the larger veins in the neck only, where there is leſs danger of accidents, more eſpecially if a ſpring fleam is uſed: for although it might be of ſome advantage in particular caſes to draw blood as near the affected part as poſſible, yet the bad conſequences frequently attending it ought to counterbalance any advantages that may be expected from it, eſpecially as the quantity of blood drawn from the ſmall veins is but inconſiderable, and of courſe no great benefit can be expected from it in horſes when they are diſeaſed.

The principal view in drawing blood is the leſſening of its quantity, by which the remaining maſs circulates with more freedom in the veſſels; it likewiſe takes off the inflammatory tendency of the blood, removes ſpaſms, &c. and prevents other bad conſequences that may follow, eſpecially in plethoric habits: and it ought always to be remembered, that when the ſigns or ſymptoms of a diſeaſe are taken from the motion of the blood, the diſorders ariſing from it depend upon its circulation being either increaſed or diminiſhed; hence, therefore, all the changes which take place in the texture, quantity, and quality of the blood, are attended with a diminution or increaſe of its velocity.

Although the caſes which may require bleeding are numerous, yet one general caution is neceſſary, namely, never to take away blood but when it is abſolutely neceſſary; for it is a fluid that may be eaſily taken away, but cannot be ſo eaſily replaced; beſides, the practice of bleeding frequently, or at ſtated times, is exceedingly improper, as it diſpoſes the body to become lax, weak, and plethoric. In bleeding, therefore, a due regard muſt always be had to the conſtitution, age, ſtrength, &c. of horſes, and the ſtate or habit of body they are in at the time.

Although we ought to be ſparing of drawing blood from horſes on trifling occaſions when they may be ſaid to be in health, yet when caſes occur that do require it, it may not only ſafely, but uſefully, be recommended to take away a greater quantity at once than is generally done; that is, from ſix to eight pounds, which will be about three or four quarts Engliſh meaſure, according to the urgency of the ſymptoms, &c. at the time, ſtrength and age of the horſe conſidered. For as horſes are very ſubject to inflammatory diſeaſes and thoſe that are of the ſpaſmodic kind, and as bleeding plentifully relaxes the whole ſyſtem in theſe caſes, the taking away a ſmall quantity of blood, about one quart or two pounds, is in fact trifling with the diſeaſe; the horſe is ſaid to have been *blooded*, and that ſatisfies his owner and the farrier; time is loſt; the diſeaſe acquires ſtrength; it will then be beyond the power of art to mitigate or to conquer it: hence the horſe falls a ſacrifice to timidity and ignorance. It is to be remembered, that inflammatory diſeaſes, particularly when the bowels are affected, make a very rapid progreſs in horſes; and if they are not overcome at the beginning by bleeding plentifully, the horſe commonly dies in 24 or 30 hours of a gangrene and mortification in the inteſtines. Purging.

Sect. III. *Of Purging.*

Purging is often neceſſary in groſs full horſes, in ſome diſorders of the ſtomach, liver, &c. but ſhould be directed with caution. Before a purge is given to any horſe, it is neceſſary ſome preparation ſhould be made for it, in order to render the operation more ſafe and efficacious: thus a horſe that is full of fleſh ſhould firſt be bled, and at the ſame time have his diet lowered for a week, eſpecially thoſe that have been pampered for ſale; ſeveral maſhes of ſcalded bran ſhould alſo previouſly be given, in order to open the bowels, and unload them of any indurated excrement, which ſometimes proves an obſtacle to the working of the phyſic, by creating great ſickneſs and griping.

Let it be remembered, that a horſe is purged with difficulty; that the phyſic generally lies 24 hours in the guts before it works; and that the tract of bowels it has to paſs through is above 30 yards, all lying horizontally: conſequently reſinous and other improper drugs may, and often do, by their violent irritation, occaſion exceſſive gripings and cold ſweats, ſhave off the very mucus or lining of the guts, and bring on inflammations, which often terminate in mortifications and death. It is remarkable too, that the ſtomach and guts of a horſe are but thin, compared to ſome other animals of the ſame bulk, and therefore muſt be more liable to inflammation and irritation.

Horſes kept much in the ſtable, who have not the proper benefit of air and exerciſe in proportion to their food, ſhould in ſpring have a mild purge or two after a previous preparation by bleeding, lowering their diet, and ſcalded maſhes.

Horſes that fall off in their ſtomach, whether it proceeds from too full feeding, or ingendering crudities and indigeſted matter, ſhould have a mild purge or two.

Horſes of a hot temperament will not bear the common aloetic purges; their phyſic therefore ſhould be mild and cooling.

Purging is always found very beneficial in ſtubborn dry coughs: but mild mercurials joined with them make them yet more efficacious.

Horſes of a watery conſtitution, who are ſubject to ſwelled legs, that run a ſharp briny ichor, cannot have the cauſes removed any way ſo effectually as by purging.

The firſt purge you give to a horſe ſhould be mild, in order to know his conſtitution.

It is a miſtaken notion, that if a proper prepared purge does not work to expectation, the horſe will be injured by it; for though it does not paſs by ſtool, its operation may be more efficacious as an alterative to purify

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Purging. purify the blood, and it may paſs by urine or other ſecretions.

Purging medicines are very ſucceſsfully given in ſmall quantities, mixed with others; and act then as alteratives.

If mercurial phyſic is given, care ſhould be taken that it be well prepared; and warmer cloathing and greater circumſpection are then required.

Purges ſhould be given early in the morning upon an empty ſtomach: about three or four hours after the horſe has taken it, he ſhould have a feed of ſcalded bran; and a lock or two of hay may then be put into his rack. The ſame day give him two more maſhes; but ſhould he refuſe warm meat, he may be allowed raw bran.

All his water ſhould be milk-warm, and have a handful of bran ſqueezed in it; but if he refuſes to drink white water, give it him without bran.

Early the next morning give him another maſh; but if he refuſes to eat it, give him as much warm water as he will drink: let him be properly cloathed, and rode gently about. This ſhould be done two or three times a-day, unleſs he purges violently; once or twice will then be ſufficient: at night give him a feed of oats mixed with bran.

During the working, a horſe ſhould drink plentifully; but if he will not drink warm water, he muſt be indulged with cold, rather than not drink at all.

We ſhall here inſert ſome general forms of purges.

TAKE ſocotorine aloes ten drams, jalap and ſalt of tartar each two drams, grated ginger one dram, oil of cloves 30 drops; make them into a ball with ſyrup of buckthorn. Or,

TAKE aloes and cream of tartar each one ounce, jalap two drams, cloves powdered one dram, ſyrup of buckthorn a ſufficient quantity.

Or the following, which has an eſtabliſhed character among ſportſmen:

TAKE aloes from ten drams to an ounce and an half, myrrh and ginger powdered each half an ounce, ſaffron and oil of aniſeed each half a dram.

Mr Gibſon recommends the following:

TAKE ſocotorine aloes ten drams, myrrh finely powdered half an ounce, ſaffron and freſh jalap in powder of each a dram; make them into a ſtiff ball with ſyrup of roſes, then add a ſmall ſpoonful of rectified oil of amber.

The ſocotorine aloes ſhould always be preferred to the Barbadoes or plantation aloes, though the latter may be given to robuſt ſtrong horſes; but even then ſhould always be prepared with the ſalt or cream of tartar, which, by opening its parts, prevents its adheſion to the coats of the ſtomach and bowels; from whence horrid gripings, and even death itſelf, has often enſued. This caution is well worth remarking, as many a horſe hath fallen a ſacrifice to the neglect of it.

Half an ounce of Caſtile ſoap, to a horſe of a groſs conſtitution, may be added to any of the above; and the proportions may be increaſed for ſtrong horſes.

When mercurial phyſic is intended, give two drams of calomel over night, mixed up with half an ounce of diapente and a little honey, and the purging ball the next morning.

The following, when it can be afforded, is a very gentle and effectual purge, particularly for fine delicate horſes; and if prepared with the Indian rhubarb, will Purging. not be expenſive.

TAKE of the fineſt ſocotorine aloes one ounce, rhubarb powdered half an ounce or ſix drams, ginger grated one dram; make into a ball with ſyrup of roſes.

The following purging drink may be given with the utmoſt ſafety; it may be quickened or made ſtronger, by adding an ounce more ſenna, or two drams of jalap.

TAKE ſenna two ounces; infuſe it in a pint of boiling water two hours, with three drams of ſalt of tartar; pour off, and diſſolve in it four ounces of Glauber's ſalts, and two or three of cream of tartar.

This laſt phyſic is cooling, eaſy, and quick in its operation; and greatly preferable in all inflammatory caſes to any other purge, as it paſſes into the blood, and operates alſo by urine.

When horſes loſe their appetite after purging, it is neceſſary to give them a warm ſtomach-drink made of an infuſion of camomile-flowers, aniſeeds, and ſaffron: or the cordial ball may be given for that purpoſe.

Should the purging continue too long, give an ounce of diaſcordium in an Engliſh pint of Port-wine; and repeat it once in 12 hours, if the purging continues. Plenty of gum-arabic water ſhould alſo be given; and in caſe of violent gripes, fat broth glyſters or tripe liquor ſhould be often thrown up, with 100 drops of laudanum in each.

The Arabic ſolution may be thus prepared.

TAKE of gum arabic and tragacanth of each four ounces, juniper-berries and carraway-ſeeds of each an ounce, cloves bruiſed half an ounce; ſimmer gently in a gallon of water till the gums are diſſolved: give a quart at a time in half a pail of water; but if he will not take it freely this way, give it him often in a horn.

When a purge does not work, but makes the horſe ſwell, and refuſe his food and water, which is ſometimes the effect of bad drugs or catching cold, warm diuretics are the only remedy; of which the following are recommended.

TAKE a pint of white-wine, nitre one ounce; mix with it a dram of camphire, diſſolved in a little rectified ſpirit of wine; then add two drams of oil of juniper, and the ſame quantity of unrectified oil of amber, and four ounces of honey or ſyrup of marſhmallows.

When a horſe ſwells with much phyſic, do not ſuffer him to be rode about till he has ſome vent; but rather lead him gently in hand till ſome evacuation is obtained.

As it is obſerved, that horſes more willingly take ſweet and palatable things than thoſe that are bitter and of an ill taſte, care ſhould be taken that the latter be given in balls, and that their drinks be always contrived to be as little naufeous as poſſible, and ſweetened either with honey or liquorice. Thoſe that are prepared with groſs powders are by no means ſo agreeable to a horſe as thoſe made by infuſion; as the former often clam the mouth, irritate the membranes about the palate and throat, and frequently occaſion the cough they are intended to prevent.

Balls ſhould be of an oval ſhape, and not exceed the ſize

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Clyſters.

ſize of a pullet's egg: when the doſe is larger, it ſhould be divided into two; and they ſhould be dipt in oil, to make them ſlip down the eaſier.

The following cathartic balls are recommended by Mr Taplin *; the ingredients of which are differently proportioned, ſo as to ſuit different circumſtances in reſpect to ſtrength, age, ſize, and conſtitution:

* *Stable Directory*, p. 36.

1. Socotorine aloes one ounce; India rhubarb two drachms; jalap and cream of tartar each one drachm; ginger (in powder) two ſcruples; eſſential oil of cloves and aniſeed each twenty drops; ſyrup of buckthorn a ſufficient quantity to form the balls.
2. Socotorine aloes ten drams; rhubarb, jalap, and ginger, each two drams; cream of tartar three drams, and ſyrup of buckthorn to make the ball.
3. Barbadoes aloes nine drams; jalap, Caſtile ſoap, and cream of tartar, of each two drams; diagrydium and ginger (in powder) each a dram; ſyrup of buckthorn ſufficient to make the ball.
4. Barbadoes aloes ten drams; Caſtile ſoap and jalap (in powder) of each half an ounce; cream of tartar and ginger each two drams; oil of aniſeed forty drops; of cloves twenty drops; which form into a ball with ſyrup of roſes or buckthorn.

† From *Clark's Obſervations*, p. 287.

SECT. IV. *Of Clyſters* †.

CLYSTERS adminiſtered to horſes, are of greater importance in relieving them from many acute complaints, than is generally imagined; and it were to be wiſhed, that, in place of the more expenſive cordial drenches, &c. which are but too frequently given in moſt of theſe caſes, a ſimple clyſter of warm water, or thin water-gruel, were ſubſtituted in their ſtead; the latter proving of great benefit, whilſt the former too frequently prove hurtful.

Clyſters ſerve not only to evacuate the contents of the inteſtines, but alſo to convey very powerful medicines into the ſyſtem, when perhaps it is not practicable to do it by the mouth: for although they are only conveyed into the larger inteſtines, and perhaps hardly penetrate into the ſmaller; ſtill they are extremely uſeful, by fomenting as it were the latter, and at the ſame time by ſoftening the hardened excrement that is accumulated in the former, and rendering it ſo ſoft as to be expelled out of the body, by which flatulencies or other offending matters that may be pent up in them are likewiſe expelled. Beſides, by their warmneſs and relaxing powers, they act as a fomentation to the bowels: hence they may be of conſiderable ſervice in removing ſpaſmodic conſtrictions in the bowels, carrying off flatulencies, and in preventing inflammation in the inteſtines, &c.; or, by conveying opiates to the parts affected, give ſpeedy relief in cholics, &c. &c.

The uſe of emollient clyſters in fevers are conſiderable. They act by revulſion, and relieve the head when too much affected. Beſides, by throwing in a quantity of diluting liquor into the inteſtines, it not only relaxes and cleanſes them, but may be ſaid to cool the body in general; at the ſame time, a conſiderable portion of the liquid is abſorbed and conveyed into the maſs of blood, by which means it is diluted; and, in particular complaints in the bowels, clyſters give almoſt immediate relief, as the remedies, when judiciouſly preſcribed, paſs immediately to the parts affected, with little or no alteration from the powers of the body.

Clyſters.

Nor is the uſe of clyſters confined to medicines only: food and nouriſhment may be conveyed into the ſyſtem in this way, when a horſe is unable to ſwallow any thing by the mouth. Horſes have frequently been ſupported for ſeveral days together by nouriſhing clyſters, made of thick water-gruel, during violent inflammations or tumors in the throat, till ſuch time as they have been diſcuſſed or ſuppurated.

Nor will theſe effects appear ſtrange to thoſe who have an acquaintance with the anatomical ſtructure of the body. For the ſake of thoſe who have not, it may juſt be ſufficient to obſerve, that certain veſſels called lacteals, whoſe mouths open into the inner cavity of the inteſtines, abſorb or drink up the chyle or nouriſhment that is produced from the food, and convey it into the maſs of blood. The ſame proceſs takes place when nouriſhment is conveyed into the inteſtines by the anus or fundament: only the food requires to be ſo far prepared, broken down and diluted with water, as to render it fit to be abſorbed by the veſſels mentioned above.

In adminiſtering clyſters, it ought always to be obſerved, that the contents of the clyſter be neither too hot nor too cold, as either of theſe extremes will ſurpriſe the horſe, and cauſe him to eject or throw it out before it has had time to have any effect. Previous to introducing the clyſter-pipe, the operator, after anointing his hand and arm with oil, butter, or hog's-lard (obſerving, at the ſame time, that the nails of his fingers are ſhort), may introduce it into the rectum, and draw out the hardened dung gradually. This operation, in farriery, is termed *back-racking*; and becomes the more neceſſary, as it frequently happens that great quantities of hardened dung is, in ſome caſes, collected in the rectum, and which the horſe cannot void eaſily without aſſiſtance of this kind.

The compoſition of clyſters ſhould be extremely ſimple: on that account they will be eaſily prepared, and as eaſily adminiſtered, provided the operator is furniſhed with a ſuitable inſtrument for the purpoſe. The generality of clyſter-pipes that are uſed, are by far too ſmall and too ſhort: although it may appear a kind of paradox, yet it is a fact, that a clyſter-pipe of a larger ſize than the ordinary ones, and of a proper thickneſs, is much eaſier introduced into the anus than one that is conſiderably ſmaller. It is likewiſe obvious, that when the pipe is too ſhort, it renders clyſters of no uſe, becauſe it cannot convey the clyſters ſo far up into the inteſtines as is neceſſary for them to be retained; a ſmall ſhort pipe of ſix or eight inches long, is not capable of conveying the injection to the end of the rectum, which, in a horſe of a middling ſize, is about 16 or 18 inches long.

But farther, after the hardened dung is taken out of the rectum by the operation above mentioned, the bladder being diſtended and full of urine, it cannot exert its contracting power immediately, ſo as to expel its contents; it therefore preſſes up the empty rectum, and forms as it were a kind of tumor in it: if the pipe

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Clyſters. is too ſhort, it cannot reach beyond this riſing in the rectum, which forms as it were a declivity back towards the anus; and hence the liquor regurgitates or flows back at the anus as ſoon as it is diſcharged from the pipe.

The ſmallneſs of the bag or bladder, which is generally proportioned to that of the pipe, is another very material objection to theſe inſtruments, as it ſeldom contains one quart of liquid; from which circumſtance, very little benefit can be derived from the uſe of them in ſuch large inteſtines as thoſe of a horſe. Doctor Bracken, in his firſt volume, page 203. has a very judicious remark on the uſe of clyſters. He obſerves, that "the colon of a horſe ſeems to be three guts, by reaſon of the two necks of about half a yard each, is drawn up into many cells or purſes by means of two ligaments, one of which runs along the upper and the other the under ſide of it, which, with the aſſiſtance of a valve or flap at its beginning, hinder the excrements either from returning back into the ſmall guts, or falling too ſoon downwards, before the chyle or milky ſubſtance prepared from the food be ſent into its proper veſſels. And, indeed, the cæcum or blind gut, which is the firſt of the three larger guts, ſeems to be ſo contrived in the manner of a valve, to hinder the aliment and chyle from paſſing too ſoon into the colon; for, if the aliment and chyle were not in ſome meaſure hindered in their paſſage through theſe large guts, the body could not be ſufficiently ſupplied with nouriſhment. The firſt of theſe colons is about a yard and a half in length, the ſecond about a yard, and the third, or that part which joins the rectum or arſe-gut, near ſix yards in length; ſo that the colon of a horſe 14 hands high, may be ſaid to be nearly eight yards and a half long; and, from it, along the rectum or ſtraight gut to the anus, where the excrements are diſcharged, is not above half a yard; ſo that it is plain, clyſters operate moſtly in the colon; though I muſt ſay they are given in too ſmall quantities; for what ſignifies two quarts of liquor in a gut nine yards long, and four or five inches diameter, in a natural ſtate; but in the colic, it is ſo diſtended with flatulencies, that its diameter exceeds ſeven or eight inches, as I have frequently obſerved in thoſe dying of that diſtemper."

Large ſyringes are frequently uſed for the purpoſe of giving clyſters; but of all the inſtruments ever invented, they ſeem the moſt improper for horſes. The ſhortneſs and ſmallneſs of their ivory pipes, are not only a material objection againſt the uſe of them, but they are apt to tear and wound the gut; for if a horſe ſhould prove reſtleſs, either from pain, as in caſes of the gripes, or from viciouſneſs, the ſyringe and pipe being quite inflexible, in the ſtruggle to throw up the injection the gut may be wounded or hurt, by which a diſcharge of blood and other bad conſequences may follow. But although there was not the leaſt chance of their hurting the horſe or wounding the gut, yet the force with which they throw up the liquor, always cauſes a ſurpriſe, of courſe a reſiſtance, attended with a vigorous effort to throw it out; which indeed frequently happens before the pipe of the ſyringe is withdrawn, and frequently upon the operator.

The moſt proper inſtrument for the giving of clyſters, is a ſimple bag or ox-bladder, which will hold two or three quarts, tied to the end of a wooden pipe about 14 or 15 inches long, one inch and a half diameter where the bag is tied, and of a gradual taper to the extremity, where the thickneſs ſhould ſuddenly increaſe, and be rounded off at the point, and made as ſmooth as poſſible; the perforation or hole through the pipe may be made ſufficiently large, ſo as to admit the end of a common funnel, for pouring in the liquor into the bag. By the flexibility of the bladder at the end of this inſtrument, no danger can happen to the horſe; the clyſter is conveyed ſo far up into the inteſtines that it will be retained; it cauſes no ſurpriſe (providing the liquor be neither too hot nor too cold, but milk warm), as no other force is required to throw it up than the holding the bag a little higher than the level of the pipe; by which means the liquor flows gently into the gut, without any ſurpriſe to the horſe. After uſing the bag, it may be blown full of wind, a cork put into the pipe, and hung up in ſome dry place to prevent it from rotting; by which means it will laſt a conſiderable time. Clyſters

Clyſters are diſtinguiſhed by different names, which denote the quality of the ingredients of which they are compoſed, as emollient, laxative, diuretic, anodyne, &c. As the more general uſe of clyſters, in the practice of farriery, would be attended with the moſt ſalutary effects, eſpecially in acute diſeaſes, where the ſpeedieſt aſſiſtance is neceſſary, we ſhall here ſubjoin ſome forms of recipes for compoſing them, together with the caſes in which they may be adminiſtered with advantage.

1. *Emollient clyſter.* Two or three quarts of thin water-gruel, ſalad oil and coarſe ſugar, of each ſix ounces. Diſſolve the ſugar in the water-gruel, then add the ſalad oil—Give it milk warm.

2. *Laxative clyſter.* Two or three quarts of thin water-gruel, Glauber's ſalts eight ounces, ſalad oil ſix ounces.

When Glauber's ſalts are not at hand, common ſalt may be uſed in its ſtead.

A great variety of recipes might be added for making clyſters, compoſed of the infuſion of different herbs, ſeeds, &c. But the above ingredients are always eaſily got; and they will be found to anſwer all the intentions required under this head, which is to ſoften the hardened excrements, to lubricate the inteſtines, and, by exciting a gentle ſtimulus, promote a free diſcharge of their contents; which, when once obtained, ſeldom fails of giving relief in inflammatory caſes, ſpaſms, &c.

3. *Purging clyſter.* Infuſe two ounces of ſenna in two quarts of boiling water; ſtrain it off; then add ſyrup of buckthorn and common oil, of each four ounces.

This clyſter will operate more briſkly than the former, and, on that account, may be preferred when an immediate or ſpeedy diſcharge is neceſſary.

4. *Anodyne clyſter.* The jelly of ſtarch, or infuſion of lintſeed, one pint; liquid laudanum, one ounce or about two table ſpoonfuls.

When there is reaſon to apprehend inflammation in the bowels, opium may be given in place of laudanum, from 20 to 30 grains, in proportion to the urgency of the ſymptoms; it ought to be well triturated or rubbed;

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Clyſters.

bed in a mortar, with a little of the liquid, till it has thoroughly diſſolved. The ſmallneſs of the quantity of liquid here recommended, gives it the better chance of being the longer retained, as the good effects to be derived from the opium depend entirely on this circumſtance. This clyſter is proper to be given in violent gripings, attended with purging, in order to blunt the ſharpneſs of the corroding humours, and to allay the pain uſually attending in ſuch caſes. The ſtarch will in ſome meaſure ſupply the deficiency of the natural mucus, or covering of the inteſtines, which has been carried off by violent purging. It may be repeated, if the ſymptoms continue violent, only diminiſhing the quantity of laudanum or of the opium.

5. *Nouriſhing clyſter.* Thick water-gruel three quarts.

When clyſters of this kind are found neceſſary, they may be given four or five times in the day, according as circumſtances may require; they are of conſiderable ſervice in caſes where the horſe cannot eat ſufficiently to ſupport him, or ſwallow any thing, from inflammation of the throat, jaws, &c. or in convulſions, attended with a locked jaw, &c.

6. *Diuretic clyſter.* Venice turpentine two ounces; Caſtile ſoap one ounce. Diſſolve the ſoap in two quarts of warm water; then add the turpentine, after it has been well beat up with the yolks of two eggs.

This diuretic clyſter is of great uſe in the ſtrangury, and obſtructions in the urinary paſſages; and as it is immediately applied to the parts affected, it ſeldom fails of giving relief, and has a much better effect when preſcribed in this manner than when given by the mouth: by this laſt way it mixes with the whole maſs of fluids, and may loſe a conſiderable portion of its diuretic quality before it reaches the kidneys; but, by being adminiſtered in the form of a clyſter, it is readily abſorbed by the neighbouring veſſels, and promotes a free diſcharge of urine.

It would be needleſs to add more forms of clyſters, as thoſe above mentioned will anſwer moſt caſes, without any material alteration, but what may be eaſily ſupplied by the judicious practitioner.

There are a variety of caſes where clyſters may be adminiſtered with great ſucceſs, beſides thoſe already hinted at; as in inflammatory fevers, ſpaſmodic conſtrictions, and cholicky complaints in the bowels; in recent coughs, apoplexy, convulſions, paralytic complaints, or ſwelling of the belly whether from air pent up in the bowels or from hardened excrements; in caſes where horſes are troubled with worms, as the aſcarides which lodge in the lower part of the inteſtines, or when bott-worms are obſerved ſticking in the anus, or voided with the dung; in very coſtive habits, before laxative or opening medicines are given by the mouth; in wounds which penetrate deep into the muſcular or tendinous parts, or in the belly, &c. in inflammations of the eyes, or when the head ſeems particularly affected; in inflammatory ſwellings on any part of the body, when a horſe cannot ſwallow any food, &c. whether it proceeds from ſpaſm in the muſcles of the throat, inflammations, or ſwellings. Clyſters compoſed of mucilaginous ſubſtances, as ſtarch, lintſeed, &c. are of great benefit in violent diarrhœas or looſeneſs, whether it proceeds from a natural diſcharge, or from too ſtrong purging medicines.

It ought always to be remembered, that clyſters ſhould be repeated frequently, till ſuch time as the diſorder for which they are given is either removed or greatly abated. This injunction may be the more readily complied with, as the adminiſtering clyſters to horſes is not attended either with much trouble or diſturbance to them.

Rowels and Setons.

SECT. V. *Rowels and Setons* *.

* *From the ſame.*

1. ROWELS for horſes, anſwer the ſame purpoſe as iſſues in the human body. The method of introducing them is by making an inciſion through the ſkin, about three-eighths of an inch long, and then ſeparating the ſkin from the fleſh with the finger, or with a blunt horn, all round the orifice, as far as the finger will eaſily reach; then introducing a piece of leather, very thin, ſhaped round, about the ſize of a crown piece, having a large round hole in the middle of it. Previous to introducing the leather, it ſhould be covered with lint or tow, and dipped into ſome digeſtive ointment; a pledget of tow, dipped in the ſame ointment, ſhould likewiſe be put into the orifice, in order to keep out the cold air: the parts around it ſoon ſwell, which is followed with a plentiful diſcharge, from the orifice, of yellow ſerum or lymph; and, in two or three days at moſt, the diſcharge turns into thick groſs white matter: the rowel is then ſaid to ſuppurate.

Theſe artificial vents act by revulſion or derivation; and hence they become of great uſe in many caſes, as they empty the ſurrounding veſſels by a regular ſlow diſcharge of their contents, and are even of great ſervice when there is a redundancy or fulneſs of humours in general, which may require a gradual diſcharge, in preference to greater evacuations by purging medicines, &c. Rowels ſhould be placed (eſpecially in ſome particular caſes) as near the affected part as poſſible; and, at all times, they ought to have a depending orifice, in order to admit of a free diſcharge of the matter that may be contained in them.

The parts where they ought to be inſerted, and where they are found to anſwer beſt, are the belly, inſide of the thighs, the breaſt, and outſide of the ſhoulders and hips; they are ſometimes, but very injudiciouſly, put in between the jaw-bones under the root of the tongue, where they never come to a proper ſuppuration, on account of the conſtant motion of the parts in eating, &c. neither do they anſwer any good purpoſe from being placed in that ſituation. In ſome diſorders it is found neceſſary to put in ſeveral of them at once, in order to make a ſudden revulſion from the parts affected; but this ſhould be determined by the horſe's age, ſtrength, and circumſtances that require them.

But though rowels are found very beneficial in ſome caſes, yet, like a number of other operations common to horſes, they ſometimes, by the improper uſe of them, become hurtful to the conſtitution; and, in ſome diſeaſes, they frequently, inſtead of ſuppurating, turn gangrenous. Thus, in violent fevers, where they are frequently very improperly applied, they never ſuppurate properly: whether this proceeds from the quickneſs of the pulſe, together with the violent rapidity with which the fluids in general are then carried through the veſſels, or from the violent agitation in which the whole ſyſtem is thrown,

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Rowels and Setons.

thrown, it is difficult to determine; but experience confirms the obſervation, when properly attended to. In ſuch caſes, the ſurrounding parts where the rowel is placed, ſeldom or never ſwell (as in the ordinary courſe, when they ſuppurate properly), but appear dry, or much in the ſame ſtate as when they were firſt put in; there is little or no diſcharge from the orifice; and the little that does come is thin, ichorous, and bloody. In ſuch caſes, they ought to be taken out immediately, and the parts well fomented with a ſtrong infuſion of camomile, or an emollient poultice applied, if it can be properly fixed, and frequently repeated; at intervals, the parts ought likewiſe to be bathed with ardent ſpirits, as that of wine, turpentine, &c. covering the parts from the external air; and, provided there is no fever at the time, two or three ounces of Peruvian bark may be given through the day, either made into balls or given in a liquid; and this continued till the threatening ſymptoms are removed.

Rowels are of great uſe in carrying off rheums or defluxions from the eyes; in great ſwellings of the glands, &c. about the throat and jaws, which threaten a ſuffocation; or when the head ſeems particularly affected, as in the vertigo or ſtaggers, apoplexy, &c. &c.; in recent lameneſs; ſwellings of the legs and heels, attended with a diſcharge of thin ichorous matter, &c.; in large and ſudden ſwellings in any part of the body; or when extravaſations of the fluids have taken place, from blows, bruiſes, &c. or when a horſe has had a ſevere fall, &c. and in a variety of other caſes, which will occur to the judicious practitioner.

2. Setons are of great uſe in carrying off matter from deep ſeated tumors or abſceſſes in different parts of the body. They ought all times to be uſed in preference to making deep inciſions into the muſcular parts, which not only diſfigure horſes, but ſuch deep inciſions are very difficult to heal up in them, on account of the ſituation of ſome of theſe tumors, and the horizontal poſition of the body, which is unfavourable in many caſes for procuring a depending opening in order to carry off the matter, as in tumors on the back, withers, and upper part of the neck immediately behind the ears, which are very common. Beſides the horizontal poſition of the body, the natural reſtleſſneſs and impatience of horſes renders it impracticable to fix proper bandages on thoſe elevated parts; the ſituation of them likewiſe will not admit of proper dreſſings being fixed on them with any degree of certainty of their remaining for any length of time; by which means the openings made into ſuch tumors or abſceſſes are frequently left bare, and expoſed to the cold air, &c.: hence ſuch openings degenerate into very foul ulcers, and produce a great deal of proud fleſh, and which require to be repeatedly cut away with the knife, as the ſtrongeſt cauſtics that can be applied are not ſufficient to keep it under.

Setons are introduced by long, thin, ſharp-pointed inſtruments or needles, ſhaped like a dart at the point, and having at the other extremity an eye to receive the end of the cord, which is to be left in the tumor. The ſize of the inſtrument may be determined by that of the tumor, and the thickneſs of the cord which is to follow it, and which at all times ought to be ſmaller than the perforation made by the point of the needle. Every practitioner in farriery ſhould always have a number of theſe needles by him, of different ſizes, that is, from 6 to 14 or 15 inches long, a little bended on the flat or under ſide. The following is the method of applying them in caſes of tumors, &c. When the matter is found to fluctuate in the tumor, the needle, armed with a cord at the other end, is to be introduced at the upper part of it, and the ſharp point of the inſtrument directed to, and brought out at the under or lowermoſt part of the tumor, including the whole length of it; or, if needful, through the ſound muſcular fleſh on the under part, in order to make a depending orifice for the matter to run freely off; the cord ſhould be dipped in ſome digeſtive ointment, and then tied together at both ends with a thread, in order to prevent its ſlipping out. But if, from the length of the perforation, the cord ſhould not admit of being tied together at the ends, a ſmall button of wood, or ſome ſuch ſubſtance, may be fixed at each end: only, from this circumſtance, the cord will require, when ſhifted, occaſionally to be drawn upwards and downwards; whereas, when the ends of it are tied together, it forms a circle, and may always be ſhifted downwards to the lower orifice. When the matter in the tumor appears to be wholly diſcharged or dried up, and no thickneſs appearing but where the cord is, it may then be cut out, and the orifices ſuffered to heal up.

When the needle for introducing the ſeton is to paſs near to any large blood-veſſels or nerves; in order to prevent the chance of their being wounded, it may be concealed in a canula or caſe, open at both ends; and after an opening is made at the upper part of the tumor ſufficient to admit the needle with its caſe, it may then be directed with ſafety to paſs the blood-veſſels, &c. it may then be puſhed forward through the canula and the oppoſite ſide of the tumor, and, having only the common teguments to perforate, all danger will be avoided.

Alterative Medicines.

Sect. VI. *Of Alterative Medicines.*

By alteratives, or altering medicines, are to be underſtood ſuch as, having no immediate ſenſible operation, gradually gain upon the conſtitution, by changing the humours or juices from a ſtate of diſtemperature to health. This intention in ſome caſes may perhaps be effected by correcting the acrimony of the juices, and accelerating the blood's motion; and in others by attenuating or breaking its particles, and dividing thoſe cohefions which obſtruct the capillaries or finer veſſels, and ſo promote the due ſecretions of the various fluids. It is certain, that many have but an indifferent opinion of a medicine that does not operate externally, and gratify their ſenſes with a quantity of imagined humours ejected from the body: but let ſuch people remember, that there are good humours as well as bad, which are thrown off together; that no evacuating medicine has a power of ſelecting or ſeparating the bad from the good; and conſequently that they are thrown out only in a proportionate quantity. Theſe few hints may be ſufficient to convince the judicious reader of the great advantages ariſing from alteratives, and the preference due to them in moſt caſes over purgatives; unleſs it could be proved, as already mentioned, that the latter could cull out and ſeparate from the blood the bad humours ſolely, leaving the good behind: but this

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Alterative Medicines.

this ſelective power has long been juſtly exploded as ridiculous and uncertain; ſince it is plain, that all kinds of purging medicines differ only in degree of ſtrength, and operate no otherwiſe upon different humours than as they ſtimulate more or leſs.

We ſhall therefore take this opportunity of recommending ſome alterative medicines which are not ſo generally known as they ought to be; and that too on the ſureſt grounds, a proper experience of their good effects in repeated trials. The firſt, then, is nitre or purified ſalt-petre; which has long been in great eſteem, and perhaps is more to be depended on in all inflammatory fevers than any other medicine whatever: but beſides this extenſive power of allaying inflammatory diſorders, it is now offered as an alterative remedy, taken in proper quantities for ſurfeits, molten greaſe, hidebound, greaſe-heels, &c. And as it has been known to ſucceed even in the cure of the farcy; what other diſtempers in horſes, ariſing from vitiated fluids, may it not be tried on, with a ſtrong probability of ſucceſs? This great advantage will ariſe from the uſe of this medicine over moſt others, that, as its operation is chiefly by urine, it requires no confinement or cloathing; but the horſe may be worked moderately throughout the whole courſe. This medicine has been found equally efficacious (by many trials made in one of our hoſpitals) in correcting the acrimony of the juices, and diſpoſing the moſt obſtinate and inveterate ſores to heal up; and hence probably it came recommended as an alterative to our horſes.

The quantity of nitre given at a time ſhould be from two to three ounces a-day; let it be finely powdered, and then mix with it by little at a time as much honey as will form it into a ball: give it every morning faſting for a month; or it may be given at firſt for a fortnight only, intermitting a fortnight, and then repeat it. If it be obſerved that the horſe ſhows an uneaſineſs at the ſtomach after taking it, a horn or two of any liquor ſhould be given after it, or it may be diſſolved at firſt in his water, or mixed with his corn; though the ball, where it agrees, is the eaſieſt method of giving.

When horſes take drinks with great reluctance, powders muſt be given in their feeds: thus crude antimony, or liver of antimony finely powdered, may be given to the quantity of half an ounce, night and morning; but in all ſurfeits, gum guaiacum mixed with antimony is found more efficacious. Thus,

TAKE of crude antimony finely powdered, or, where it can be afforded, cinnabar of antimony, and gum guaiacum, of each a pound: mix together with an oily peſtle to prevent the gum's caking: divide the whole into 32 doſes, viz. an ounce each doſe: let one be given every day in the evening-feed.

Or, TAKE of cinnabar of antimony, gum guaiacum, and Caſtile or Venice ſoap, of each half a pound; ſalt of tartar, four ounces: beat them up into a maſs, and give an ounce every day. To theſe may be added very advantageouſly an ounce and an half of camphor.

Æthiops mineral, given to the quantity of half an ounce a-day, is a very good ſweetener and corrector of the blood and juices; but it has been obſerved, after having been taken a week or ten days, to make ſome horſes ſlabber, and unable to chew their hay and oats; and the ſame ſymptoms have ariſen, where only two drams of crude mercury has been given, and continued about the ſame ſpace of time.

Colds.

Diet-drinks—1. A decoction of logwood, prepared like that of guaiacum, is alſo ſucceſsfully given in ſurfeits.

2. Lime-water prepared with ſhavings of ſaſſafras and liquorice, is a good diet-drink to ſweeten and correct a horſe's blood; and may be given with the nitre-balls for that purpoſe.

3. Tar-water alſo, may in many caſes be well worth trial: but let it be remembered, that all medicines of this kind ſhould be continued a conſiderable time in obſtinate caſes.

SECT. VII. *Of Colds.*

BY taking cold, we mean that the pores and outlets of the ſkin (which in a natural healthy ſtate of body are continually breathing out a fine fluid, like the ſteam ariſing from hot water, or ſmoke from fire) are ſo far ſhut up, that theſe ſteams, or perſpirable matter, not having a free paſſage through them, are hindered from going off in the uſual manner; the conſequence of which is, their recoiling on the blood, vitiating its quality, overfilling the veſſels, and affecting the head, glands or kernels of the neck and throat, the lungs, and other principal parts.

To enumerate the various cauſes of colds would be endleſs: the moſt uſual are, riding horſes till they are hot, and ſuffering them to ſtand in that condition where the air is cold and piercing; removing a horſe from a hot ſtable to a cold one, and too ſuddenly changing his cloathing; whence it is that horſes often catch ſuch ſevere colds after they come out of dealers hands, and by not being carefully rubbed down when they come in hot off journies.

Where there is a conſtant attention and care, the effects of cold are not only ſoon diſcovered, but an obſervation may be very early made to what part it more immediately directs its attack. For inſtance, if the nervous ſyſtem be the moſt irritable, the affection is quickly perceived in the eyes; if the glandular, upon the neck, throat, under the ears, or in the head: or if more particularly the ſyſtem of circulation has been affected, the conſequences are ſoon apparent upon the lungs; and will be exerted more or leſs in a cough, or difficulty of breathing, according to the ſeverity of attack, from the repulſion of perſpirable matter, and its conſequent abſorption into the circulation. As ſoon as the horſe is in this ſtate, a ſymptomatic fever attends; which is to be underſtood as no more than a degree of febrile heat or irritability dependant on the original cauſe, which gradually ceaſes as the primary diſeaſe is found to decline.

From an affection of the different parts above ſpecified, various diſorders enſue, which are treated of under their proper heads. Here we have only to conſider that kind of cold fixed on the lungs, which produces cough; and which, if taken in its firſt ſtage, generally yields to very ſimple remedies.

As ſoon as the attack has been obſerved, bleeding ſhould be inſtantly performed, according to ſymptoms, ſize, ſtate, and condition; and the blood preſerved a few hours to aſcertain its ſtate: if livid or black, with

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Colds

with a coat of size upon its surface, there is no doubt of its viscidity, and of the obstructed circulation of that fluid through the finer vessels of the lungs. In three or four hours after bleeding, give a mash prepared as follows:

TAKE of bran and oats, equal parts. Pour on boiling water a sufficient quantity: then stir in aniseed and liquorice powders, each one ounce; honey, four ounces. In two hours after the mash give a gallon or six quarts of soft water moderately warm, in which has been dissolved two ounces of nitre.

These mashes Mr Taplin directs to be "continued every night and morning, giving a moderate feed of dry oats in the middle of the day, good sweet hay in small quantities, and the same proportion of nitre to be repeated in the water after each mash. To these must be added the necessary regulations of good dressing and gentle exercise, which in general soon effect the cure of such colds as are counteracted upon the first attack."

To humour those who are not satisfied without some formal compositions, the following may be exhibited when the fever does not run high.

Pectoral Horse-ball. TAKE of the fresh powders of aniseed, elecampane, carraway, liquorice, turmerick, and flour of brimstone, each three ounces; juice of liquorice four ounces, dissolved in a sufficient quantity of mountain; saffron powdered half an ounce, salad-oil and honey half a pound, oil of aniseed one ounce: mix together with wheat-flour enough to make them into a paste.

Or the following from Dr Bracken.

TAKE aniseed, carraway seed, and greater cardamoms, finely powdered, of each one ounce, flour of brimstone two ounces, turmerick in fine powder one ounce and a half, saffron two grains, Spanish juice dissolved in water two ounces, oil of aniseed half an ounce, liquorice powder one ounce and a half, wheat-flour a sufficient quantity to make into a stiff paste by beating all the ingredients well in a mortar.

These balls consist of warm opening ingredients; and, given in small quantities, about the size of a pullet's egg, will encourage a free perspiration.

To a horse loaded with flesh, a rowel may sometimes be necessary, as may also a gentle purge or two to some when the distemper is gone off.

When the disorder has been neglected, and made a rapid progress, should the cough be violent and constant, the horse very dull and refusing his food, and the symptomatic fever run high, the blood will consequently prove as before described. In this case the symptoms will not perhaps yield to the above plan so soon as may be wished. It will therefore be necessary to repeat the bleeding in two or three days at farthest, according to circumstances. The mashes may at the same time be altered to equal parts of malt and bran, scalded with boiling water; into which, when nearly cool enough for the manger, stir elecampane, aniseed and liquorice powders, each one ounce: this mash to be repeated every night and morning; continuing also the noon-feed dry, and the nitre two ounces in the water, as before directed. By a due attention to these measures, relief will soon be obtained, and a cure generally effected in the course of a few days: Whereas, by delay or neglect, a confirmed cough, asthma, broken-wind, or consumption, may be the consequence.

Fevers in general.

SECT. VIII. *Of Fevers in general.*

1. THE symptoms of a fever are, Great restlessness; the horse ranging from one end of his rack to the other; his flanks beat; his eyes are red and inflamed; his tongue parched and dry; his breath is hot, and smells strong; he loses his appetite, and nibbles his hay, but does not chew it, and is frequently smelling to the ground; the whole body is hotter than ordinary (though not parched, as in some inflammatory disorders); he dungs often, little at a time, usually hard, and in small bits; he sometimes stales with difficulty, and his urine is high-coloured; and he seems to thirst, but drinks little at a time and often; his pulse beats full and hard, to 50 strokes and upwards in a minute.

The first intention of cure is bleeding, to the quantity of two or three quarts, if the horse is strong and in good condition: then give him a pint of the following drink, four times a-day; or an ounce of nitre, mixed up into a ball with honey, may be given thrice a-day instead of the drink, and washed down with three or four horns of any small liquor.

TAKE of baum, sage, and camomile-flowers, each a handful, liquorice-root sliced half an ounce, salt prunel or nitre three ounces; infuse in two quarts of boiling water; when cold, strain off, and squeeze into it the juice of two or three lemons, and sweeten with honey.

As the chief ingredient to be depended on in this drink is the nitre, it may perhaps be as well given in water alone; but as a horse's stomach is soon palled, and he requires palatable medicines, the other ingredients may in that respect have their use. Soleysel for this purpose advises two ounces of salt of tartar, and one of sal ammoniac, to be dissolved in two quarts of water, and mixed with a pail of common water, adding a handful of bran or barley-flour to qualify the unpleasant taste: this may be given every day, and is a useful medicine.

His diet should be scalded bran, given in small quantities; which if he refuses, let him have dry bran sprinkled with water: put a handful of picked hay into the rack, which a horse will often eat when he will touch nothing else; his water need not be much warmed, but should be given often and in small quantities: his cloathing should be moderate; too much heat and weight on a horse being improper in a fever, which scarce ever goes off in critical sweats (as those in the human body terminate), but by strong perspiration.

If in a day or two he begins to eat his bran and pick a little hay, this method with good nursing will answer: but if he refuses to feed, more blood should be taken away, and the drinks continued; to which may be added two or three drams of saffron, avoiding at this time all hotter medicines: the following glyster should be given, which may be repeated every day, especially if his dung is knotty or dry.

TAKE two handfuls of marshmallows, and one of camomile flowers; fennel-seed an ounce; boil in three quarts of water to two; strain off, and add four

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Fevers in general.

four ounces of treacle, and a pint of linſeed oil or any common oil.

Two quarts of water-gruel, fat broth, or pot-liquor, with the treacle and oil, will anſwer this purpoſe; to which may be added a handful of ſalt. Theſe ſorts of glyſters are more proper than thoſe with purging ingredients.

The following opening drink is very effectual in thoſe fevers; and may be given every other day, when the glyſters ſhould be omitted; but the nitre-balls or drink may be continued, except on thoſe days theſe are taken.

TAKE of cream of tartar and Glauber's ſalts, each four ounces; diſſolve in barley-water, or any other liquor: an ounce or two of lenitive electuary may be added, or a dram or two of powder of jalap, to quicken the operation in ſome horſes.

Four ounces of Glauber's ſalts, or cream of tartar, with the ſame quantity of lenitive electuary, may be given for the ſame purpoſe, if the former ſhould not open the body ſufficiently.

In four or five days the horſe generally begins to pick his hay, and has a ſeeming reliſh for food; tho' his flanks will heave pretty much for a fortnight: yet the temper of his body and return of appetite ſhow, that nothing more is requiſite to complete his recovery than walking him abroad in the air, and allowing plenty of clean litter to reſt him in the ſtable.

This method of treating a fever is ſimple, according to the laws of nature; and is confirmed by long experience to be infinitely preferable to the hot method.

The intention here is to leſſen the quantity of blood, promote the ſecretion of urine and perſpiration, and cool and dilute the fluids in general.

2. There is another ſort of fever that horſes are ſubject to, of a more complicated and irregular nature than the former; which, if not properly treated, often proves fatal.

The ſigns are, A ſlow fever, with languiſhing, and great depreſſions: the horſe is ſometimes inwardly hot, and outwardly cold; at other times hot all over, but not to any extreme; his eyes look moiſt and languid: he has a continual moiſture in his mouth, which is the reaſon he ſeldom cares to drink, and when he does, it is but little at a time. He feeds but little, and leaves off as ſoon as he has eat a mouthful or two; he moves his jaws in a feeble looſe manner, with an unpleaſant grating of his teeth; his body is commonly open; his dung ſoft and moiſt, but ſeldom greaſy; his ſtaling is often irregular, ſometimes little, at other times profuſe, ſeldom high-coloured, but rather pale, with little or no ſediment.

When a horſe's appetite declines daily, till he refuſes all meat, it is a bad ſign. When the fever doth not diminiſh, or keep at a ſtand, but increaſes, the caſe is then dangerous. But when it ſenſibly abates, and his mouth grows drier, the grating of his teeth ceaſes, his appetite mends, and he takes to lie down (which perhaps he has not done for a fortnight), theſe are promiſing ſigns. A horſe in theſe fevers always runs at the noſe, but not the kindly white diſcharge, as in the breaking of a cold, but of a reddiſh or greeniſh duſky colour, and of a conſiſtence like glue, and ſticks like turpentine to the hair on the inſide of the noſtrils: If this turns to a gleet of clear thin water, the horſe's hide keeps open, and he mends in his appetite; theſe are certain ſigns of recovery. Fevers in general.

The various and irregular ſymptoms that attend this ſlow fever, require great ſkill to direct the cure, and more knowledge of the ſymptoms of horſes diſeaſes than the generality of gentlemen are acquainted with. The experienced farrier ſhould therefore be conſulted and attended to, in regard to the ſymptoms; but very ſeldom as to the application of the remedy, which is generally above their comprehenſion; though it may be readily ſelected, by duly attending to the obſervations here inculcated.

Firſt, then, a moderate quantity of blood, not exceeding three pints, may be taken away, and repeated in proportion to his ſtrength, fulneſs, inward ſoreneſs, cough, or any tendency to inflammation. After this, the fever-drink firſt above-mentioned may be given, with the addition of an ounce of ſnake-root, and three drams of ſaffron and camphor diſſolved firſt in a little ſpirit of wine; the quantity of the nitre may be leſſened, and theſe increaſed as the ſymptoms indicate.

The diet ſhould be regular; no oats given, but ſcalded or raw bran ſprinkled; the beſt flavoured hay ſhould be given by handfuls, and often by hand, as the horſe ſometimes cannot lift up his head to the rack.

As drinking is ſo abſolutely neceſſary to dilute the blood, if the horſe refuſes to drink freely of warm water or gruel, he muſt be indulged with having the chill only taken off by ſtanding in the ſtable: nor will any inconvenience enſue, but oftener an advantage; for the nauſeous warmth of water, forced on horſes for a time, palls their ſtomachs, and takes away their appetites, which the cold water generally reſtores.

Should the fever after this treatment increaſe, the horſe feed little, ſtale often, his urine being thin and pale, and his dung ſometimes looſe, and at other times hard; ſhould the moiſture in his mouth continue, his ſkin being ſometimes dry and at others moiſt, with his coat looking ſtarting and ſurfeited: upon theſe irregular ſymptoms, which denote great danger, give the following balls, or drink; for in theſe caſes there is no time to be loſt.

TAKE of contrayerva-root, myrrh, and ſnake-root, powdered, each two drams, ſaffron one dram, mithridate or Venice treacle half an ounce; make into a ball with honey, which ſhould be given twice or thrice a-day, with two or three horns of an infuſion of ſnake-root ſweetened with honey; to a pint and a half of which may be added half a pint of treacle-water or vinegar, which latter is a medicine of excellent uſe in all kinds of inflammatory and putrid diſorders, either external or internal.

Should theſe balls not prove ſucceſsful, add to each a dram of camphor, and, where it can be afforded, to a horſe of value, the ſame quantity of caſtor. Or the following drink may be ſubſtituted in their ſtead for ſome days.

TAKE contrayerva and ſnake-root of each two ounces, liquorice-root one ounce, ſaffron two drams; infuſe in two quarts of boiling water cloſe covered for two hours; ſtrain off, and add half a pint of diſtilled vinegar, four ounces of ſpirit of wine, wherein half an ounce of camphor is diſſolved, and two ounces of mithridate or Venice treacle;

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Fevers in general.

treacle; give a pint of this drink every four, ſix, or eight hours.

Should the horſe be coſtive, recourſe muſt be had to glyſters, or the opening drink: ſhould he purge, take care not to ſuppreſs it, if moderate; but if, by continuance, the horſe grows feeble, add diaſcordium to his drinks, inſtead of the mithridate; if it increaſes, give more potent remedies.

Let it be remembered, that camphor is a very powerful and effectual medicine in theſe kinds of putrid fevers; being both active and attenuating, and particularly calculated to promote the ſecretions of urine and perſpiration.

Regard ſhould alſo be had to his ſtaling; which if in too great quantities, ſo as manifeſtly to depreſs his ſpirits, ſhould be controlled by proper reſtringents, or by preparing his drinks with lime-water. If, on the contrary, it happens that he is too remiſs this way, and ſtales ſo little as to occaſion a fulneſs and ſwelling of the body and legs, recourſe may be had to the following drink:

TAKE of ſalt prunella, or nitre, one ounce; juniper-berries, and Venice turpentine, of each half an ounce: make into a ball with oil of amber.

Give him two or three of theſe balls, at proper intervals, with a decoction of marſh-mallows ſweetened with honey.

But if, notwithſtanding the method we have laid down, a greeniſh or reddiſh gleet is diſcharged from his noſtrils, with a frequent ſneezing; if he continues to loſe his fleſh, and becomes hide-bound; if he altogether forſakes his meat, and daily grows weaker; if he ſwells about the joints, and his eyes look fixed and dead; if the kernels under his jaws ſwell, and feel looſe: if his tail is raiſed, and quivers; if his breath ſmells ſtrong, and a purging enſues with a diſcharge of fetid dark-coloured matter; his caſe may then be looked on as deſperate, and all future attempts to ſave him will be fruitleſs.

The ſigns of a horſe's recovery are known by his hide keeping open, and his ſkin feeling kindly; his ears and feet will be of a moderate warmth, and his eyes briſk and lively; his noſe grows clean and dry; his appetite mends, he lies down well, and both ſtales and dungs regularly.

Be careful not to overfeed him on his recovery: let his diet be light, feeds ſmall, and increaſed by degrees as he gets ſtrength; for, by overfeeding, horſes have frequent relapſes or great ſurfeits, which are always difficult of cure.

If this fever ſhould be brought to intermit, or prove of the intermitting kind, immediately after the fit is over give an ounce of Jeſuit's bark, and repeat it every ſix hours till the horſe has taken four or ſix ounces: ſhould eruptions or ſwellings appear, they ought to be encouraged; for they are good ſymptoms at the decline of a fever, denote a termination of the diſtemper, and that no further medicines are wanted.

The true reaſons, perhaps, why ſo many horſes miſcarry in fevers, are, that their maſters, or doctors, will not wait with patience, and let nature have fair play: that they generally neglect bleeding ſufficiently at firſt; and are conſtantly forcing down ſugar-ſops, or other food, in a horn, as if a horſe muſt be ſtarved in a few days if he did not eat: then they ply him twice or thrice a-day with hot medicines and ſpirituous drinks, which (excepting a very few caſes) muſt be extremely pernicious to a horſe, whoſe diet is naturally ſimple, and whoſe ſtomach and blood, unaccuſtomed to ſuch heating medicines, muſt be greatly injured, and without doubt are often inflamed by ſuch treatment.

Fevers in general.

Dilute the blood with plenty of water, or white drink; let his diet be warm bran-maſhes, and his hay ſprinkled. Should the fever riſe, which will be known by the ſymptoms above deſcribed, give him an ounce of nitre thrice a-day in his water, or made up in a ball with honey. Let his body be kept cool and open, with the opening drink, given twice or thrice a-week; or an ounce of ſalt of tartar may be given every day, diſſolved in his water, for that purpoſe, omitting then the nitre. After a week's treatment in this manner, the cordial ball may be given once or twice a-day, with an infuſion of liquorice-root ſweetened with honey; to which may be added, when the phlegm is tough, or cough dry and huſky, a quarter of a pint of linſeed or ſallad oil, and the ſame quantity of oxymel ſquills.

The following cooling purge is very proper to give at the decline of the diſtemper, and may be repeated three or four times.

TAKE two ounces of ſenna, aniſeed and fennel bruiſed each half an ounce: ſalt of tartar three drams; let them infuſe two hours in a pint of boiling water; ſtrain off, and diſſolve in it three ounces of Glauber's ſalt, and two of cream of tartar; give for a doſe in the morning.

This purge generally works before night very gently; and in fevers, and all inflammatory diſorders, is infinitely preferable to any other phyſic.

Before we cloſe this ſection on fevers, it may be no improper hint to the curious, to take notice, that a horſe's pulſe ſhould more particularly be attended to than is cuſtomary, as a proper eſtimate may thereby be made both of the degree and violence of the fever preſent, by obſerving the rapidity of the blood's motion, and the force that the heart and arteries labour with to propel it round. The higheſt calculation that has been made of the quickneſs of the pulſe in a healthy horſe, is, that it beats about 40 ſtrokes in a minute; ſo that in proportion to the increaſe above this number, the fever is riſing, and if farther increaſed to above 50 the fever is very high.

How often the pulſe beats in a minute may eaſily be diſcovered by meaſuring the time with a ſtop-watch or minute ſand-glaſs, while your hand is laid on the horſe's near ſide, or your fingers on any artery: thoſe which run up on each ſide the neck are generally to be ſeen beating, as well as felt, a little above the cheſt; and one withinſide each leg may be traced with the finger.

A due attention to the pulſe is ſo important an article, in order to form a proper judgment in fevers, that it would appear amazing it has ſo much been neglected, if one did not recollect, that the generality of farriers are ſo egregiouſly ignorant, that they have no manner of conception of the blood's circulation, nor in general have they ability enough to diſtinguiſh the difference between an artery and a vein.—With ſuch pretty guardians do we intruſt the healths and lives of the moſt valuable of animals!

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Pleurisy, Inflammation of the Lungs, &c.

Sect. IX. *Of a Pleurisy, and an Inflammation of the Lungs, &c.*

1. These disorders have scarce been mentioned by any writer on farriery before Mr Gibson; who, by frequently examining the carcases of dead horses, found them subject to the different kinds of inflammations here described.

In order to distinguish these disorders from others, we shall describe the symptoms in Mr Gibson's own words.

"A pleurisy, then, which is an inflammation of the pleura; and a peripneumony, which is an inflammation of the lungs; have symptoms very much alike; with this difference only, that in a pleurisy a horse shows great uneasiness, and shifts about from place to place; the fever, which at first is moderate, rises suddenly very high; in the beginning he often strives to lie down, but starts up again immediately, and frequently turns his head towards the affected side, which has caused many to mistake a pleuritic disorder for the gripes, this sign being common to both, though with this difference: in the gripes, a horse frequently lies down and rolls; and, when they are violent, he will also have convulsive twitches, his eyes being turned up, and his limbs stretched out, as if he were dying; his ears and feet are sometimes occasionally hot, and sometimes as cold as ice; he falls into profuse sweats, and then into cold damps; strives often to stale and dung, but with great pain and difficulty; which symptoms generally continue till he has some relief: but, in a pleurisy, a horse's ears and feet are always burning hot, his mouth parched and dry, his pulse hard and quick: even sometimes, when he is nigh dying, his fever is continued and increasing; and though in the beginning he makes many motions to lie down, yet afterwards he reins back as far as his collar will permit, and makes not the least offer to change his posture, but stands panting with short stops, and a disposition to cough, till he has some relief, or drops down.

"In an inflammation of the lungs, several of the symptoms are the same; only in the beginning he is less active, and never offers to lie down during the whole time of his sickness; his fever is strong, breathing difficult, and attended with a short cough: and whereas, in a pleurisy, a horse's mouth is generally parched and dry; in an inflammation of the lungs, when a horse's mouth is open, a ropy slime will run out in abundance; he gleets also at the nose a reddish or yellowish water, which sticks like glue to the inside of his nostrils.

"In a pleurisy, a horse heaves and works violently at his flanks, with great restlessness, and for the most part his belly is tucked up: but in an inflammation of the lungs, he always shows fulness; the working of his flanks is regular, except after drinking and shifting his posture; and his ears and feet are for the most part cold, and often in damp sweats."

2. The cure of both these disorders is the same. In the beginning a strong horse may lose three quarts of blood, the next day two quarts more; and, if symptoms do not abate, the bleedings must be repeated, a quart at a time; for it is speedy, large, and quick-repeated bleedings that are in these cases chiefly to be depended on. But if a horse has had any previous weakness, or is old, you must bleed him in less quantities, and oftener. Mr Gibson recommends rowels on each side the breast, and one on the belly; and a blistering ointment to be rubbed all over his brisket upon the foremost ribs.

Pleurisy, Inflammation of the Lungs, &c.

The diet and medicines should be both cooling, attenuating, relaxing, and diluting. After the operation of bleeding, therefore, Mr Taplin * directs "to have ready some bran and very sweet hay cut small, and scalded together; which place hot in the manger, that the fumes may be imbibed as an internal fomentation to relax the rigidity of the glands, and excite a discharge from the nostrils so soon as possible. The very nature of this case, and the danger to which the horse is exposed, sufficiently point out the propriety and consistency of exerting all possible alacrity to obtain relief, or counteract the disease in its first stage: therefore let the fumigation of scalded bran and hay be repeated every four or five hours, and the following decoction prepared without delay:

* *Gentleman's Stable Directory*, p. 215.

"Pearl barley, raisins split, and Turkey figs sliced, each six ounces; stick liquorice bruised, two ounces. Boil these in a gallon of water till reduced to three quarts; strain off; and, while hot, stir in one pound of honey, and, when cold, a pint of distilled vinegar; giving an ounce of nitre in a pint of this decoction every four, five, or six hours, according to the state and inveteracy of the disease.

"If relief is not obtained so soon as expected, and the horse is costive, give a glyster, with

"Two quarts of common gruel; coarse sugar six ounces; Glauber salts four ounces; tincture of jalap two ounces; and a quarter of a pint of olive oil. This must be repeated every 24 hours, or oftener, if necessary.

"Should the symptoms still continue violent, without discovering any signs of abatement; after waiting a proper time for the effect of previous administrations, let the bleeding be repeated, in quantity proportioned to the urgency of symptoms, continuing the decoction and nitre every three or four hours, and repeating the glyster if plentiful evacuations have not been obtained by the former injection.

"The diluting drink, before prescribed, is introduced here in preference to a ball, that its medicinal efficacy may be expeditiously conveyed to the seat of disease. So soon as the wished-for advantages are observed, and the predominant and dangerous symptoms begin to subside, when he labours less in respiration, is brisker in appearance, heaves less in the flank, dungs frequently, stales freely, runs at the nose, eats his warm mashes of scalded bran, with four ounces of honey to each, and will drink thin gruel for his common drink (in each draught of which should be dissolved two ounces of cream of tartar); in short, so soon as every appearance of danger is dispelled, the management may be the same as in a common cold; giving one of the following balls every morning for a fortnight, leaving off the mashes and diluting drink by degrees, and varying the mode of treatment as circumstances may dictate.

"Castile soap, six ounces; gum ammoniacum, two ounces; anise and cummin seeds (in powder), each four ounces; honey sufficient to form the mass, which divide into a dozen balls.

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Pleurisy, Inflammation of the Lungs, &c.

"To prevent any ill effects that may arise from the bad condition of the matter that has so long overloaded the vessels of the lungs, such as the formation of ulcers, knots, or tubercles, the best method will be, so soon as the horse (with great care, gentle exercise, moderate and regular feeding) has recovered in a tolerable degree his natural strength, to put him upon the following gentle course of physic; and it will become more immediately necessary, where the horse bears about him remnants of the distemper, either in a gleet from the nose, rattling in his throat, difficulty of breathing, or heaving in the flanks.

"Socotorine aloes nine drams; rhubarb and jalap each a dram and a half; gum ammoniacum, calomel, and ginger, each a dram; oil of juniper sixty drops; syrup of buckthorn sufficient to make a ball.

"Six clear days or more, if the horse is weak, should be allowed between each dose."

There is also an external pleurisy, or inflammation of the muscles between the ribs, which, when not properly treated, proves the foundation of that disorder called the *chest-founder*; for if the inflammation is not dispersed in time, and the viscid blood and juices so attenuated by internal medicines that a free circulation is obtained, such a stiffness and inactivity will remain on these parts, as will not easily be removed, and which is generally known by the name of *chest-founder*.

The signs of this inflammation, or external pleurisy, are a stiffness of the body, shoulders, and fore-legs; attended sometimes with a short dry cough, and a shrinking when handled in those parts.

Bleeding, soft pectorals, attenuants, and gentle purges, are the internal remedies; and, externally, the parts affected may be bathed with equal parts of spirit of sal ammoniac and ointment of marshmallows or oil of camomile.

These outward inflammations frequently fall into the inside of the fore-leg, and sometimes near the shoulder; forming abscesses, which terminate the disorder.

Sect. X. *Of a Cough, and Asthma.*

Cough and Asthma.

The consequences of colds neglected or injudiciously treated, are settled habitual coughs, asthmas, broken-wind, and consumption.

Of coughs two are chiefly distinguished. The one is loose, almost continual, and increasing to violence upon the least motion: the other is a short dry cough, preceded by a husky hollow kind of wheezing, as if respiration was obstructed by fragments of hay or corn retained in the passage. This last is the kind of cough called *asthma* by most writers, and for which mercurial purges have been recommended. These, however, Mr Taplin observes, may perhaps be exhibited with more propriety after the administration of a course of the following balls, should they fail in the desired effect. Bleeding must be first performed, and occasionally repeated in small quantities, till the glandular inflammation and irritability are allayed, and the blood so attenuated by the constant use of nitre, as to render the circulation free through the finer vessels of the lungs, from the obstructions in which all the difficulties proceed. Bleeding having taken place with the necessary circumspection as to quantity, let the two ounces of nitre be given punctually every night and morning in the water, as particularized under the article *Colds*, continuing one of the following balls every morning for a fortnight or three weeks, that a fair and decisive trial may be obtained.

Detergent Pectoral Ball.—Take of Castile soap, aniseed, and liquorice powders, each five ounces; Barbadoes tar, six ounces; gum ammoniacum, three ounces; balsam of Tolu, one ounce; honey (if required) to make a mass; which divide into a dozen balls.

If there should appear no abatement of the symptoms after the above trial, bleeding must be repeated, and mercurials had recourse to. Mr Taplin advises "two doses of mercurial physic to be given eight days apart, and prepared by the addition of a dram and a half of calomel to either of the purging balls (under the articles of purging) best calculated for the horse's strength and condition. After which repeat the above pectoral balls, with the addition of gum myrrh, Benjamin and Venice turpentine, each two ounces; dividing the mass into balls of two ounces each, repeating them every morning till the above proportion (with these additions) are totally consumed."

The other kind, or that long loud hollow cough which is almost incessant, and continually increasing upon the least hurry in exercise, proceeds equally from irritability and the action of the slimy mucus upon the glands in respiration, as well as the viscidity and sluggish motion of the blood through the finer passages; but yields to remedies with much less difficulty than the asthmatic. In this case, as in the other, bleeding must be premised, and followed by a mash compounded of equal parts of bran and oats, into which must be stirred and dissolved, while hot, honey four ounces. This mash must be repeated, with two ounces of nitre in the water, without intermission, every night and morning; giving also every morning the following ball, being an improvement by Mr Taplin upon the *cordial ball* of Braken.

Take Turkey figs, Spanish liquorice, aniseed, and liquorice powders, each four ounces; carraway seeds, elecampane, and anisated balsam, each two ounces; saffron, ginger (in powder), and oil of aniseed, each six drachms; honey sufficient to form the mass; and divide into twelve balls; of which let one be given every morning.

The figs and saffron are to be beat to a paste in the mortar previous to their incorporation with the other articles, the Spanish liquorice is to be softened over the fire by boiling in a small quantity of spring-water, and the whole of the ingredients mixed in a proper manner. "These balls (says our author) are powerfully cordial and restorative; they promote glandular excretion, warm and stimulate the stomach to the expulsion of wind, enliven the circulation, and invigorate the whole frame, as has been sufficiently ascertained by their instantaneous effect in the chase, where their excellence has been repeatedly established; but more particularly in deep swampy countries, when, after a severe burst, or a repetition of strong leaps, the horse has been so off his wind, or in fact, nature so exhausted, as not to be able to proceed a stroke farther; the immediate administration of a single ball has not only afforded instant

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Broken Wind.

ſtant relief, but the horſe gone through the day with his uſual alacrity."

Before cloſing this ſection, it may be neceſſary to obſerve, that ſome young horſes are ſubject to coughs on cutting their teeth; their eyes alſo are affected from the ſame cauſe. In theſe caſes, always bleed; and if the cough is obſtinate, repeat it, and give warm maſhes; which, in general, are alone ſufficient to remove this complaint.

Sect. XI. *Of a Broken Wind.*

This diſorder, Mr Gibſon is inclined to think, frequently originates from injudicious or haſty feeding of young horſes for ſale; by which means the growth of the lungs, and all the contents within the cheſt, are ſo increaſed, and in a few years ſo preternaturally enlarged, that the cavity of the cheſt is not capacious enough for them to expand themſelves in and perform their functions.

A narrow contracted cheſt with large lungs may ſometimes naturally be the cauſe of this diſorder: and it has been obſerved, that horſes riſing eight years old are as liable to this diſtemper, as, at a certain period of life, men are to fall into aſthmas, conſumptions, and chronic diſeaſes.

The reaſon why it becomes more apparent at this age, may be, that a horſe comes to his full ſtrength and maturity at this time; at ſix, he commonly finiſhes his growth in height; after that time he lets down his belly and ſpreads, and all his parts are grown to their full extent; ſo that the preſſure on the lungs and midriff is now more increaſed.

But how little weight ſoever theſe reaſons may have, repeated diſſections have given ocular proofs of a preternatural largeneſs, not only of the lungs of broken-winded horſes, but of their heart and its bag, and of the membrane which divides the cheſt; as well as of a remarkable thinneſs in the diaphragm or midriff. This diſproportion has been obſerved to be ſo great, that the heart and lungs have been almoſt of twice their natural ſize, perfectly ſound, and without any ulceration whatever, or any defect in the wind-pipe or its glands. Hence it appears, that this enormous ſize of the lungs, and the ſpace they occupy, by hindering the free action of the midriff, is the chief cauſe of this diſorder: and as the ſubſtance of the lungs was found more fleſhy than uſual, they of courſe muſt loſe a great deal of their ſpring and tone.

Whoever conſiders a broken-wind in this light, muſt own that it may be reckoned among the incurable diſtempers of horſes; and that all the boaſted pretenſions to cure are vain and frivolous, ſince the utmoſt ſkill can amount to no more than now and then palliating the ſymptoms, and mitigating their violence.

We ſhall therefore only lay down ſuch methods as may probably prevent this diſorder, when purſued in time. But if they ſhould not ſucceed, we ſhall offer ſome remedies and rules to mitigate its force, and make a horſe as uſeful as poſſible under this malady.

It is uſual, before a broken-wind appears for a horſe to have a dry obſtinate cough, without any viſible ſickneſs or loſs of appetite; but, on the contrary, a diſpoſition to foul feeding, eating the litter, and drinking much water.

In order then to prevent, as much as poſſible, this diſorder, bleed him, and give him the mercurial phyſic above preſcribed, which ſhould be repeated two or three times.

The following balls are then to be taken for ſome time, which have been found extremely efficacious in removing obſtinate coughs.

Take aurum moſaicum, finely powdered, eight ounces; myrrh and elecampane, powdered, each four ounces; aniſeeds and bay-berries, each an ounce; ſaffron, half an ounce; make into balls with oxymel ſquills.

The aurum moſaicum is made of equal parts of quickſilver, tin, ſal ammoniac, and ſulphur. We give this medicine as ſtrongly recommended by Mr Gibſon; but how far the aurum moſaicum may contribute to its efficacy, may perhaps juſtly be diſputed: as a ſubſtitute in its room, therefore, for this purpoſe, we recommend the ſame quantity of powdered ſquills, or gum ammoniacum, or equal parts of each.

Broken-winded horſes ſhould eat ſparingly of hay, which as well as their corn may be wetted with chamber lye, or fair water; as this will make them leſs craving after water.

The volatile ſalts in the urine may make it preferable to water, and may be the reaſon why garlic is found ſo efficacious in theſe caſes; two or three cloves given at a time in a feed, or three ounces of garlic bruiſed, and boiled in a quart of milk and water, and given every other morning for a fortnight, having been found very ſerviceable; for by warming and ſtimulating the ſolids, and diſſolving the tenacious juices which choke up the veſſels of the lungs, theſe complaints are greatly relieved.

Careful feeding and moderate exerciſe has greatly relieved broken-winded horſes.

Horſes ſent to graſs in order to be cured of an obſtinate cough, have often returned completely broken-winded, where the paſture has been rich and ſucculent, ſo that they have had their bellies conſtantly full. As the ill conſequences therefore are obvious, where you have not the conveniency of turning out your horſe for a conſtancy, you may foil him for a month or two with young green barley, tares, or any other young herbage.

To purſive thick-winded horſes, Barbadoes and common tar have often been given with ſucceſs, to the quantity of two ſpoonfuls, mixed with the yolk of an egg, diſſolved in warm ale, and given faſting two or three times a-week, eſpecially thoſe days you hunt or travel.

But in order to make all theſe ſorts of horſes of any real ſervice to you, the grand point is to have a particular regard to their diet, obſerving a juſt economy both in that and their exerciſe; giving but a moderate quantity of hay, corn, or water, at a time, and moiſtening the former, to prevent their requiring too much of the latter, and never exerciſing them but with moderation, as has before been obſerved. The following alterative ball may be given once a fortnight or three weeks; and as it operates very gently, and requires no confinement but on thoſe days it is given (when warm meat and water are neceſſary), it may be continued for two or three months.

Take ſocotorine aloes ſix drams; myrrh, galbanum, and ammoniacum, of each two drams; bay-berries.

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Broken Wind.

ries half an ounce: make into a ball with a ſpoonful of oil of amber, and a ſufficient quantity of ſyrup of buckthorn.

Mr Taplin ridicules the idea of overgrown lungs, and ſuggeſts the following as grounds of a more rational opinion concerning the ſource of this diſeaſe.

"Whether horſes who have been in the habit of full or foul feeding, with a very trifling portion of exercife, and without any internal cleanſing from evacuations, compulſively obtained by purgatives or diuretics, may not conſtantly engender a quantity of viſcid, tough, phlegmatic, matter; which accumulating by ſlow degrees, may ſo clog and fill up ſome of that infinity of minute paſſages with which the lungs are known to abound, as probably to obſtruct the air veſſels in their neceſſary expanſion for the office of reſpiration? And whether this very probable obſtruction or partial ſuppreſſion may not in ſudden, haſty, and long continued exertions, rupture others, and by ſuch local deficiency affect the elaſticity of the whole? The probability, and indeed great appearance of this progreſs, has ever influenced me moſt forcibly to believe, that ſuch obſtructions once formed, the evil accumulates, till a multiplicity of the veſſels become impervious, and render the lungs, by their conſtant accumulation and diſtention, too rigid for the great and neceſſary purpoſe of reſpiration."

That ſuch a defect may ſometimes occur, as a cheſt too narrow for lungs of an uncommon extenſion, that conſtitute naturally what are called *thick-winded horſes*, our author does not deny: in which caſes, it is agreed, there is no hope of a cure, nor ſcarcely of any alleviation. But he will by no means admit the above deformity to be a caſe of common occurrence, far leſs that it is the univerſal or even the moſt ordinary cauſe of broken wind.

"It cannot but be obſerved (ſays he) what an anxious deſire a broken-winded horſe always diſplays to obtain water; a ſelf-evident conviction he is rendered uneaſy by ſome glutinous adheſive internal ſubſtance, that inſtinct alone prompts the animal to expect drinking may waſh away: on the contrary, if, as Bartlet and Gibſon ſuppoſe, 'the lungs are too large for the cheſt,' every thing that increaſes the bulk of the abdomen or viſcera (and conſequently the preſſure upon the diaphragm) muſt increaſe the diſquietude, which is natural to believe from the ſagacity of animals in other inſtances, they would in this moſt carefully avoid."

Mr Taplin therefore concludes, that if his hypotheſis is founded in fact (which circumſtances will not allow him the leaſt reaſon to doubt), a cure may certainly be expected, provided the attempt is made upon the firſt appearance of the diſeaſe; though he does not hold out the probability where the original cauſe has been of long ſtanding, and no attempts made to relieve.

In attempting the cure, the natural and obvious indications are, To promote the neceſſary evacuations in the firſt inſtance, to attenuate the viſcidity of the glutinous obſtructed matter, and to deterge the paſſages by a ſtimulation of the ſolids. Bleeding is therefore the firſt meaſure; and it ought to be repeated at proper intervals in moderate quantities, till diveſted of the coat of ſize and livid appearance that are certain ſigns of the lungs being obſtructed either by viſcidity or inflammation. After bleeding, the horſe muſt go thro' a regular courſe of the mild purging balls preſcribed after recovery from pleuriſy. They are ſlightly impregnated with mercurial particles, and blended with the gums form a moſt excellent medicine for the purpoſe. In three days after the operation of the third doſe, Mr Taplin directs to begin upon the following detergent balſamics, and continue to give one ball every morning, ſo long as may be thought neceſſary to form a fair opinion whether the advantage is gained or relief likely to be obtained. Conſumption.

TAKE of the beſt white ſoap eight ounces; gum guaiacum and ammoniacum, each three ounces; myrrh and Benjamin, aniſeed and liquorice, each two ounces; balſam of Peru, Tolu, and oil of aniſeed, each half an ounce; Barbadoes tar ſufficient to make a maſs, which divide into twenty balls.

It is neceſſary to be ſtrictly obſerved, that during this courſe hay and water are to be diſpenſed with a very ſparing hand, ſo as to prevent too great an accumulation in the ſtomach or inteſtines, that an obſervation may be made with the greateſt certainty, whether any hopes of ſucceſs from medicine may be juſtly entertained; if not, farther expence will be unadviſable, as it will appear, after ſuch trial, an incurable malady at all events, and only ſuſceptible of palliation.

SECT. XII. *Of a Conſumption.*

WHEN a conſumption proceeds from a defect in a horſe's lungs or any principal bowel, the eyes look dull; the ears and feet are moſtly hot; he coughs ſharply by fits; ſneezes much, and frequently groans with it; his flanks have a quick motion: he gleets often at the noſe, and ſometimes throws out a yelloviſh curdled matter; and he has little appetite to hay, but will eat corn, after which he generally grows hot.

As to the cure, one of the principal things is bleeding in ſmall quantities (a pint, or pint and half, from ſome horſes is ſufficient), which ſhould be repeated as often as the breath is more than ordinarily oppreſſed. Pectorals may be given to palliate preſent ſymptoms; but as diſſections have diſcovered both the glands of the lungs and meſentery to be ſwelled, and often indurated, the whole ſtreſs lies on mercurial purges, and the following ponderous alteratives, given intermediately.

TAKE native cinnabar, or cinnabar of antimony, one pound, powdered very fine, and add the ſame quantity of gum guiacum and nitre; give the horſe an ounce of this powder twice a-day, wetting his feeds.

The ſpring-graſs is often extremely ſerviceable; but the ſalt maſhes are to be preferred, and to be more depended on than medicines; for great alterations are thereby made in the blood and juices, and no ſmall benefit ariſes from open air and proper exerciſe.

SECT. XIII. *Of Apoplexy or Staggers, Lethargy, Epilepſy, and Palſy.*

FARRIERS generally include all diſtempers of the head under two denominations, viz. *ſtaggers* and *convulſions*, wherein they always ſuppoſe the head primarily affected. But in treating theſe diſorders, we will diſtinguiſh

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Apoplexy, Lethargy, &c.

ſtinguiſh between thoſe that are peculiar to the head, as having their ſource originally thence; and thoſe that are only concomitants of ſome other diſeaſe.

In an apoplexy a horſe drops down ſuddenly, without other ſenſe or motion than a working at his flanks.

The previous ſymptoms are, drowſineſs; watery eyes, ſomewhat full and inflamed; a diſpoſition to reel; feebleneſs; a bad appetite; the head almoſt conſtantly hanging, or reſting on the manger; ſometimes with little or no fever, and ſcarce any alteration in the dung or urine; the horſe is ſometimes diſpoſed to rear up, and apt to fall back when handled about the head; which is often the caſe with young horſes, to which it does not ſuddenly prove mortal, but with proper help they may ſometimes recover. If the apoplexy proceeds from wounds or blows on the head, or matter on the brain; beſides the above ſymptoms, the horſe will be frantic by fits, eſpecially after his feeds, ſo as to ſtart and fly at every thing. Theſe caſes ſeldom admit of a perfect recovery; and when horſes fall down ſuddenly, and work violently at their flanks, without any ability to riſe after a plentiful bleeding, they ſeldom recover.

All that can be done is to empty the veſſels as ſpeedily as poſſible, by ſtriking the veins in ſeveral parts at once, bleeding to four or five quarts; and to raiſe up the horſe's head and ſhoulders, ſupporting them with plenty of ſtraw. If he ſurvives the fit, cut ſeveral rowels: give him night and morning glyſters prepared with a ſtrong decoction of ſenna and ſalt, or the purging glyſter mentioned in the directions; blow once a day up his noſtrils a dram of powder of aſarabacca, which will promote a great diſcharge; afterwards two or three aloetic purges ſhould be given; and to ſecure him from a relapſe, by attenuating and thinning his blood, give him an ounce of equal parts of antimony and crocus metallorum for a month; or, which is preferable, the ſame quantity of cinnabar of antimony and gum guaiacum.

If the fit proceeds only from fulneſs of blood, high feeding, and want of ſufficient exerciſe, or a fizy blood (which is often the caſe with young horſes, who though they reel, ſtagger, and ſometimes ſuddenly fall down, yet are eaſily cured by the above method), an opening diet with ſcalded bran and barley will be neceſſary for ſome time; and the bleeding may be repeated in ſmall quantities.

As to the other diſorders of the head, ſuch as lethargy or ſleeping evil, epilepſy or falling-ſickneſs, vertigo, frenzy, and madneſs, convulſions, and paralytical diſorders, as they are moſt of them to be treated as the apoplexy and epilepſy, by bleeding and evacuations, with the alteratives there directed, we ſhall wave treating of them ſeparately; but mention ſome particular rules to diſtinguiſh them, according to the plan we laid down; and then offer ſome general remedies for the ſeveral purpoſes.

In an epilepſy or falling ſickneſs, the horſe reels and ſtaggers, his eyes are fixed in his head, he has no ſenſe of what he is doing, he ſtales and dungs inſenſibly, he runs round and falls ſuddenly; ſometimes he is immoveable, with his legs ſtretched out as if he was dead, except only a quick motion of his heart and lungs, which cauſes a violent working of his flanks; ſometimes he has involuntary motions, and ſhaking of his limbs, ſo ſtrong, that he has not only beat and ſpurned his litter, but the pavement with it; and with theſe alternate ſymptoms a horſe has continued more than three hours, and then has as ſurpriſingly recovered: at the going off of the fit, he generally foams at the mouth, the foam being white and dry, like what comes from a healthful horſe when he champs on the bit.

Apoplexy, Lethargy, &c.

But in all kinds of gripes, whether they proceed from diſorders in the guts or retention of urine, a horſe is often up and down, rolls and tumbles about; and when he goes to lie down, generally makes ſeveral motions with great ſeeming carefulneſs, which ſhows he has a ſenſe of his pain; and if he lies ſtretched out for any time, it is generally but for a ſhort ſpace.

Epilepſies and convulſions may ariſe from blows on the head, too violent exerciſe, and hard ſtraining; and from a fulneſs of blood, or impoveriſhed blood, and ſurfeits; which are ſome of the cauſes that denote the original diſorder.

In lethargic diſorders, the horſe generally reſts his head with his mouth in the manger, and his poſe often reclined to one ſide; he will ſhow an inclination to eat, but generally falls aſleep with his food in his mouth, and he frequently ſwallows it whole without chewing: emollient glyſters are extremely neceſſary in this caſe, with the nervous balls recommended for the ſtaggers and convulſions; ſtrong purges are not requiſite, nor muſt you bleed in too large quantities, unleſs the horſe be young and luſty. In old horſes, rowels and large evacuations are improper; but volatiles of all kinds are of uſe when they can be afforded: the alterative purge mentioned at the end of this ſection may be given and repeated on amendment.

This diſtemper is to be cured by theſe means, if the horſe is not old and paſt his vigour. It is a good ſign if he has a tolerable appetite, and drinks freely without ſlabbering, and if he lies down and riſes up carefully, though it be but ſeldom.

But if a lethargic horſe does not lie down; if he is altogether ſtupid and careleſs, and takes no notice of any thing that comes near him; if he dungs and ſtales ſeldom, and even while he ſleeps and dozes, it is a bad ſign: if he runs at the noſe thick white matter, it may relieve him; but if a viſcid gleet, that ſticks to his noſtrils like glue, turn to a profuſe running of ropy, reddiſh, and greeniſh matter, it is an infallible ſign of a great decay of nature, and that it will prove deadly.

Young horſes from four to ſix years, are very ſubject to convulſions, from botts in the ſpring; and the large coach breed more than the ſaddle. They are ſeized without any previous notice; and if botts and worms are diſcovered in their dung, the cauſe ſeems to be out of doubt, more eſpecially if they have lately come out of a dealer's hands.

When this convulſion proceeds from a diſtemperature of the midriff, or any of the principal bowels, it is to be diſtinguiſhed from botts and vermin by previous ſymptoms; the horſe falls off his ſtomach, and grows gradually weak, feeble, and diſpirited, in his work, and turns ſhort-breathed with the leaſt exerciſe.

The lively deſcription of that univerſal cramp or convulſion, called by ſome the *ſtag-evil*, which ſeizes all the muſcles of the body at once, and locks up the jaws, ſo that it is impoſſible almoſt to force them open, we ſhall give in Mr Gibſon's own words, who ſays: As ſoon as the

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Apoplexy, Lethargy, &c.

the horſe is ſeized, his head is raiſed with his noſe towards the rack, his ears pricked up, and his tail cocked, looking with eagerneſs as an hungry horſe when hay is put down to him, or like a high-ſpirited horſe when he is put upon his mettle; inſomuch, that thoſe who are ſtrangers to ſuch things, when they ſee a horſe ſtand in this manner, will ſcaree believe any thing of conſequence ails him; but they are ſoon convinced, when they ſee other ſymptoms come on apace, and that his neck grows ſtiff, cramped, and almoſt immoveable: and if a horſe in this condition lives a few days, ſeveral knots will ariſe on the tendinous parts thereof, and all the muſcles both before and behind will be ſo much pulled and cramped, and ſo ſtretched, that he looks as if he was nailed to the pavement, with his legs ſtiff, wide, and ſtradling; his ſkin is drawn ſo tight on all parts of the body, that it is almoſt impoſſible to move it; and if trial be made to make him walk, he is ready to fall at every ſtep, unleſs he be carefully ſupported; his eyes are ſo fixed with the inaction of the muſcles, as give him a deadneſs in his looks; he ſnorts and ſneezes often, pants continually with ſhortneſs of breath; and this ſymptom increaſes continually till he drops down dead; which generally happens in a few days, unleſs ſome ſudden and very effectual turn can be given to the diſtemper.

In all theſe caſes the horſe ſhould firſt be bled plentifully, unleſs he is low in fleſh, old, or lately come off any hard continued duty; then you muſt be more ſparing of his blood; afterwards give the following ball:

TAKE aſafetida half an ounce, Ruſſia caſtor powdered two drams, valerian root powdered once ounce; make into a ball with honey and oil of amber.

This ball may be given twice a-day at firſt; and then once, waſhed down with a decoction of miſletoe or valerian ſweetened with liquorice or honey: an ounce of aſafetida may be tied up in a piece of ſtrong coarſe linen rag, and put behind his grinders to champ on.

The laxative purges and emollient glyſters ſhould be given intermediately to keep the body open; but when the former balls have been taken a week or ten days, the following may be given once a-day with the valerian decoction.

TAKE cinnabar of antimony ſix drams; aſafetida half an ounce; ariſtolochia, myrrh, and bay-berries, of each two drams; make into a ball with treacle and oil of amber.

This is the moſt effectual method of treating theſe diſorders; but when they are ſuſpected to ariſe from botts and worms, which is generally the caſe, mercurial medicines muſt lead the way, thus:

TAKE mercurius dulcis and philonium, of each half an ounce; make into a ball with conſerves of roſes, and give the horſe immediately: half the quantity may be repeated in four or five days.

The following infuſion ſhould then be given, to the quantity of three or four horns, three or four times a-day, till the ſymptoms abate; when the above nervous balls may be continued till they are removed.

TAKE penny-royal and rue of each two large handfuls, camomile flowers one handful, aſafetida and caſtor of each half an ounce, ſaffron and liquorice-root ſliced of each two drams; infuſe in two quarts of boiling-water; pour off from the ingredients as wanted. Apoplexy, Lethargy, &c.

If the caſtor is omitted, add an ounce of aſafetida.

The following ointment may be rubbed into the cheeks, temples, neck, ſhoulders, ſpine of the back, and loins, and wherever there is the greateſt contractions and ſtiffneſs.

TAKE nerve and marſhmallow ointment of each four ounces, oil of amber two ounces, with a ſufficient quantity of camphorate ſpirit of wine; make a liniment.

When the jaws are ſo locked up that medicines cannot be given by the mouth, it is more eligible to give them by way of glyſter: for forcing open the jaws by violence often puts a horſe into ſuch agonies, that the ſymptoms are thereby increaſed.

In this caſe alſo he muſt be ſupported by nouriſhing glyſters, made of milk-pottage, broths, &c. which muſt be given to the quantity of three or four quarts a-day: glyſters of this kind will be retained, and abſorbed into the blood; and there have been inſtances of horſes thus ſupported for three weeks together, who muſt otherwiſe have periſhed.

Mr Gibſon mentions ſome extraordinary inſtances of ſucceſs in caſes of this ſort by theſe methods, and repeated frictions, which are extremely ſerviceable in all convulſive diſorders, and often prevent their being jaw-ſet; they ſhould be applied with unwearied diligence every two or three hours, wherever any ſtiffneſs or contractions in the muſcles appear; for a horſe in this condition never lies down till they are in ſome meaſure removed.

The uſe of rowels in theſe caſes is generally unſucceſsful, the ſkin being ſo tenſe and tight, that they ſeldom digeſt kindly, and ſometimes mortify: ſo that if they are applied, they ſhould be put under the jaws, and in the breaſt.

The red-hot iron ſo frequently run through the foretop and mane, near the occipital bone, for this purpoſe, has often been found to have deſtroyed the cervical ligament.

In paralytic diſorders, where the uſe of a limb or limbs is taken away, the internals above recommended ſhould be given, in order to warm, invigorate, and attenuate the blood; and the following ſtimulating embrocation ſhould be rubbed into the parts affected.

TAKE oil of turpentine four ounces, nerve ointment and oil of bays of each two ounces, camphor rubbed fine one ounce, rectified oil of amber three ounces, tincture of cantharides one ounce.

With this liniment the parts affected ſhould be well bathed for a conſiderable time, to make it penetrate; and when the hind parts chiefly are lame, the back and loins ſhould be well rubbed with the ſame. To the nervous medicines above recommended may be added ſnake-root, contrayerva, muſtard-ſeed, horſe-radiſh root, ſteeped in ſtrong beer, or wine where it can be afforded. Take the following for an example, which may be given to the quantity of three pints a-day alone, or two horns full may be taken after the nervous balls.

TAKE ſnake-root, contrayerva, and valerian, of each half an ounce; muſtard-ſeed and horſe-radiſh root ſcraped, of each two ounces; long pepper two drams: infuſe in three pints of ſtrong wine.

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Strangles and Vives.

When the horſe is recovering from any of the above diſorders, the following alterative purge may be repeated two or three times, as it operates very gently.

Take ſocotorine aloes one ounce, myrrh half an ounce, aſafetida and gum ammoniacum of each two drams, ſaffron one dram; make into a ball with any ſyrup.

Where a retention of dung is the cauſe of this diſorder, the great gut ſhould firſt be raked thoroughly with a ſmall hand, after which plenty of emollient oily glyſters ſhould be thrown up, and the opening drink given, till the bowels are thoroughly emptied of their impriſoned dung. Their diet ſhould for ſome days be opening, and conſiſt chiefly of ſcalded bran, with flour of brimſtone, ſcalded barley, &c.

Sect. XIV. *Of the Strangles, and Vives.*

1. The Strangles is a diſtemper to which colts and young horſes are very ſubject. The ſymptoms and progreſs of this diſeaſe are as follows: A dull heavineſs and inactivity, loſs of appetite, and a hollow huſky cough, occaſioned by the irritability of the inflamed glandular parts in the throat and about the root of the tongue. To excite a degree of moiſture in the mouth that may allay this diſagreeable ſenſation, the horſe is often picking his hay, but eats little or none; a degree of ſymptomatic heat comes on, and a conſequent clamminеſs and thirſt is perceptible. As the diſtemper advances, he becomes proportionally languid and inattentive; a ſwelling (with ſometimes two or three ſmaller ſurrounding it) is now diſcovered to have formed itſelf between the jaw-bones, which is at firſt very hard, exceeding painful, and viſibly increaſing; he now ſwallows with difficulty, heaves in the flanks, and his whole appearance gives ſigns of the greateſt diſtreſs.

The firſt object for conſideration is the ſtate of the ſubject: if the evacuations are regular (as they generally are), and the feveriſh ſymptoms moderate, let the ſwelling be examined, and its ſuppuration promoted. For this purpoſe (firſt clipping away all the long or ſuperfluous hairs that cover or ſurround the part), foment with ſmall double flannels, dipt in a ſtrong decoction of camomile, marſh-mallows, or roſemary, for ten minutes, as hot as can be conveniently ſubmitted to; and then apply a poultice prepared as follows.

Take of coarſe bread, barley meal, and camomile or elder flowers, each a handful; boil over the fire in a ſufficient quantity of milk, or in the decoction for the fomentation; into which ſtir about a third (of the whole quantity) of white-lily root, waſhed clean and pounded to a paſte; adding linſeed and fenugreek (in powder) of each an ounce; ſtirring in, while hot, of turpentine two ounces, and of lard four, laying it on moderately warm, and bandaging firm. To ſerve for two poultices.

Both the fomentation and poultice muſt be repeated every night and morning till an opening in the ſwelling is effected, which generally happens in the courſe of five or ſix days. Upon the appearance of diſcharge, the aperture may be a little enlarged with a biſtory or the point of any ſharp inſtrument adequate to the purpoſe, though this will be unneceſſary if the diſcharge is made freely and eaſily of itſelf. The part ſhould then be dreſſed with the following ointment ſpread on tow, ſtill continuing the poultice over it to promote the digeſtion, and prevent any remaining hardneſs.

Strangles and Vives.

Take roſin and Burgundy pitch of each a pound and a half, honey and common turpentine each eight ounces, yellow wax four ounces, hog's-lard one pound, verdigris finely powdered one ounce; melt the ingredients together, but do not put in the verdigris till removed from the fire; and it ſhould be ſtirred in by degrees till the whole is grown ſtiff and cool.

If the fever and inflammation run high, and the ſwelling be ſo ſituated as to endanger ſuffocation, a moderate quantity of blood muſt be taken away.

In this diſorder, maſhes muſt be the conſtant food, in ſmall proportions, to prevent waſte: in each of which Mr Taplin directs to put of liquorice and aniſeed powders half an ounce, and about two ounces of honey, or in lieu of this laſt a quart of malt: The drink, conſiſting of warm water impregnated with a portion of ſcalded bran or water-gruel, ſhould be given in ſmall quantities and often. The head muſt be kept well covered with flannel, as the warmth will greatly tend to aſſiſt in promoting the neceſſary diſcharge: tho', unleſs circumſtances and weather forbid, the horſe need not be confined, but ſhould have the advantage of air and ſhort gentle exerciſe. Nor ſhould regular dreſſing, and the accuſtomed courſe of ſtable diſcipline, be omitted, but only uſed in a leſs degree than formerly when in health.

This diſtemper is ſeldom dangerous, unleſs from neglect, ignorant treatment, or cruel uſage. It generally terminates with a running at the noſe, in a greater or leſs degree; which ſhould be frequently cleanſed from the inſide of the noſtrils, by means of a ſponge ſufficiently moiſtened in warm water, to prevent its acquiring an adheſion to thoſe parts, or a foulneſs and fetor that would ſhortly become acrimonious.

If a hardneſs remains after the ſores are healed up, they may be anointed with the following mercurial ointment.

Take of crude mercury or quickſilver one ounce, Venice turpentine half an ounce; rub together in a mortar till the globules of the quickſilver are no longer viſible; then add, by little and little, two ounces of hog's-lard, juſt warm and liquefied; and let the whole be kept cloſe covered for uſe. When the horſe has recovered his ſtrength, purging will be neceſſary.

If a copious and offenſive diſcharge from the noſtrils ſhould continue after the abſceſs is healed up, there will be reaſon to ſuſpect the diſeaſe called *glanders*, treated of in a ſubſequent ſection.

2. The Vives or Ives differ from the ſtrangles only in this; that the ſwellings of the kernels ſeldom gather or come to matter, but by degrees perſpire off and diſperſe by means of warm cloathing, anointing with the marſhmallow ointment, a moderate bleeding, and a doſe or two of phyſic. But ſhould the inflammation continue notwithſtanding thoſe means, a ſuppuration muſt be promoted by the methods recommended in the ſtrangles.

When theſe ſwellings appear in an old or full-aged horſe, they are ſigns of great malignity, and often of

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Diſeaſes of the Eyes.

an inward decay, as well as forerunners of the glanders.

Sect. XV. *Of the Diſeaſes of the Eyes.*

1. The caſes that moſt frequently occur, requiring medical aid, or admitting of cure, are generally the effects either of cold, or of blows, bites or other external injuries. In thoſe proceeding immediately from cold, there is perceived an inflammation upon the globe of the eye, and internal ſurrounding parts, as the edges of the eye-lids. &c. Inſtead of its former tranſparency, the eye has a thick cloudy appearance upon its outer covering, and is conſtantly diſcharging an acrid ſerum, which in a ſhort time almoſt excoriates the parts in its paſſage. The horſe drops his ears, becomes dull and ſluggiſh, is frequently ſhaking his head as if to ſhake off the ears, and in every action diſcovers pain and diſquietude. In this caſe, after bleeding, the treatment preſcribed in the Section of *Colds* muſt be adopted and perſevered in; and to cool the parts, and allay the irritation occaſioned by the ſcalding ſerum, let the eyes and ſurrounding parts be gently waſhed twice or thrice every day with a ſponge or tow impregnated with the following ſolution:

Sugar of lead one dram, white vitriol two ſcruples, ſpring water half a pint, brandy or camphorated ſpirits one ounce or two table-ſpoonfuls.

If the inflammation ſhould not ſeem likely to abate, but to wear a threatening appearance, the following diuretic medicine muſt be adminiſtered.

Caſtile ſoap twelve ounces, yellow roſin and nitre (in powder) each eight ounces, powdered camphire one ounce, and oil of juniper ſix drams; mixed with a ſufficient quantity of ſyrup or honey. The maſs is to be divided into 12 balls, rolled up in liquorice or aniſeed powder; one of which is to be given every morning, uſing alſo gentle work or moderate exerciſe.

2. The effects ariſing from blows or bites form different appearances, according to the ſeverity of the injury ſuſtained. Should inflammation and ſwelling proceed from either cauſe, bleeding will be neceſſary without delay, and may be repeated at proper intervals till the ſymptoms appear to abate; and let the parts be plentifully embrocated four times a day with the following preparation of Goulard's cerate.

Extract of Saturn three drams; camphorated ſpirits one ounce; river or pond water one pint. The extract to be firſt mixed with the ſpirits, and then the water to be added.

If a large ſwelling, laceration, or wound, attends; after waſhing with the above, apply a warm poultice of bread, milk, and a little of the lotion, ſoftened with a ſmall portion of hog's lard or olive oil. In caſes of leſs danger, or in remote ſituations where medicines are not eaſily procured, the following may be uſed as a ſubſtitute.

Beſt white-wine vinegar half a pint, ſpring water a quarter of a pint, and beſt brandy a wine glaſs or half a gill.

3. As to the gutta ſerena, cataract, film, &c. theſe are caſes in which relief is very ſeldom obtained.

The gutta ſerena is a partial or univerſal loſs of ſight, where no palpable defect or fault appears in the eye, except that the pupil is a little more enlarged or contracted. The appearances of this blemiſh are various, as well as the cauſes and effects, ſome of its ſubjects being totally blind, and others barely enabled to diſtinguiſh between light and darkneſs. The ſigns are a blackneſs of the pupil, an alteration of the ſize of the eye, and its not contracting or dilating upon a ſudden expoſure to any degree of light. In order to the cure, it is neceſſary to attend to the cauſe, and to apply ſuch remedies as that may indicate: though in truth it is a diſorder in which, from whatever cauſe originating, no great expectation can be formed from medicine either internally or externally; more particularly from the former, the ſeat of diſeaſe being ſo far out of the reach of medicinal action. If the defect ſhould be owing to a contraction of or compreſſion upon the optic nerve, very little can be done with any expectation of ſucceſs; and much leſs if it ariſes from a palſy of that or any neighbouring part.

Diſeaſes of the Eyes.

A cataract is a defect in the cryſtalline humour of the eye, which, becoming opaque, prevents the admiſſion of thoſe rays upon the retina that conſtitute viſion. The diſorder called *moon-eyes*, are only cataracts forming. Theſe generally make their appearance when a horſe is turned five coming ſix; at which time one eye becomes clouded, the eye-lids being ſwelled, and very often ſhut up; and a thin water generally runs from the diſeaſed eye down the cheek, ſo ſharp as ſometimes to excoriate the ſkin; the veins of the temple, under the eye, and along the noſe, are turgid and full: though ſometimes it happens that the eye runs but little. This diſorder comes and goes till the cataract is ripe; then all pain and running diſappears, and the horſe becomes totally blind, which is generally in about two years. During this time ſome horſes have more frequent returns than others; which continue in ſome a week or more, in others three or four; returning once in two or three months, and they are ſeldom ſo long as five without a relapſe. There is another kind of *moon-blindneſs* which is alſo the forerunner of cataracts, where no humour or weeping attends. The eye is never ſhut up or cloſed here, but will now and then look thick and troubled, at which time the horſe ſees nothing diſtinctly: when the eyes appear ſunk and periſhing, the cataracts are longer of coming to maturity; and it is not unuſual in this caſe for one eye to eſcape. Theſe caſes generally end in blindneſs of one if not of both eyes. The moſt promiſing ſigns of recovery are when the attacks come more ſeldom, and their continuance grows ſhorter, and that they leave the cornea clear and tranſparent, and the globe plump and full.

In all blemiſhes or defects, where a thickening of ſome one of the coats, membranes, or humours of the eye, has formed an appearance of cataract or film, it has been an eſtabliſhed cuſtom among moſt farriers to beſtow a plentiful application of corroſive powders, unguents, and ſolutions, for the purpoſes of obliteration; without reflecting (as Mr Taplin obſerves) upon the abſurdity of endeavouring to deſtroy by corroſion, what is abſolutely ſeparated from the ſurface by a variety of membranous coverings, according to the diſtinct ſeat of diſeaſe; with which it is impoſſible to bring the intended remedy into contact, without firſt deſtroying the intervening or ſurrounding parts by which the inner delicate ſtructure is ſo numerouſly guarded. But in all diſorders of this ſort, whether moon-eyes or confirmed

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Glanders. firmed cataracts with a weeping, general evacuations with internal alteratives can only take place. Indeed the attempts to cure cataracts have hitherto generally produced only a palliation of the ſymptoms, and ſometimes have proved entirely deſtructive. Yet early care, it is ſaid, has in ſome inſtances proved ſucceſsful. To this end rowelling is preſcribed, with bleeding at proper intervals, except where the eyes appear ſunk and periſhing. It is alſo directed, during the violence of the ſymptoms, to obſerve a cooling treatment; giving the horſe two ounces of nitre every day mixed into a ball with honey; and bathing the parts above the eye with verjuice or vinegar wherein roſe-leaves are infuſed, to four ounces of which half a drachm of ſugar of lead may be added. The ſwelling on the lid may afterwards be bathed with a ſponge dipt in equal parts of lime and Hungary water mixed together; and the following cooling phyſic ſhould be given every fourth day, till the eye becomes clear.

Lenitive electuary and cream of tartar of each four ounces, Glauber's ſalts three ounces, ſyrup of buckthorn two ounces.

When the weeping is by theſe means removed, the alterative powders (ſee the Section *Of Alterative Medicines*) ſhould be given every day, till two or three pounds are taken, and after an interval of three months the ſame courſe ſhould be repeated. This method, it is affirmed, has often been attended with good ſucceſs, where the eyes have been full and no way periſhed.

4. The haws is a ſwelling and ſponginеſs that grows in the inner corner of the eye, ſo large ſometimes as to cover a part of the eye. The operation here is eaſily performed by cutting part of it away; but the farriers are apt to cut away too much: the wound may be dreſſed with honey of roſes; and if a fungus or ſpongy fleſh ariſes, it ſhould be ſprinkled with burnt alum, or touched blue with vitriol.

Sect. XVI. *Of the Glanders.*

M. de la Foſſe has diſtinguiſhed ſeven different kinds of glanders, four of which are incurable.

The firſt proceeds from ulcerated lungs, the purulent matter of which comes up the trachea, and is diſcharged through the noſtrils, like a whitiſh liquor, ſometimes appearing in the lumps and grumes: in this diſorder, though the matter is diſcharged from the noſtrils, yet the malady is ſolely in the lungs.

The ſecond is a waſting humour, which uſually ſeizes horſes at the decline of a diſeaſe, cauſed by too hard labour; this defluxion alſo proceeds from the lungs.

The third is a malignant diſcharge, which attends the ſtrangles ſometimes, and falls upon the lungs, which runs off by the noſtrils.

The fourth is, when an acrimonious humour in the farcy ſeizes theſe parts, where it ſoon makes terrible havock.

The fifth kind we ſhall deſcribe by and by, as ariſing from taking cold.

The ſixth kind is a diſcharge from the ſtrangles, which ſometimes vents itſelf at the noſtrils.

In the ſeventh ſort, which he calls the *real glanders*, the diſcharge is either white, yellow, or greeniſh, ſometimes ſtreaked or tinged with blood: when the diſeaſe is of long ſtanding, and the bones are fouled, the matter turns blackiſh, and becomes very fetid; and is always attended with a ſwelling of the kernels or glands under the jaws; in every other reſpect the horſe is generally healthy and ſound, till the diſtemper has been of ſome continuance. Glanders.

It is always a bad ſign when the matter ſticks to the inſide of the noſtrils like glue or ſtiff paſte; when the inſide of the noſe is raw, and looks of a livid or lead colour; when the matter becomes bloody, and ſtinks; and when it looks of an aſh-colour. But when only a limpid fluid is firſt diſcharged, and afterwards a whitiſh matter, the gland under the jaw not increaſing, and the diſorder of no long continuance, we may expect a ſpeedy cure; for in this caſe, which ariſes from taking cold after a horſe has been overheated, the pituitary membrane is but ſlightly inflamed, the lymph in the ſmall veſſels condenſed, and the glands overloaded, but not yet ulcerated.

Our author affirms this diſeaſe to be altogether local; and that the true ſeat of it is in the pituitary membrane which lines the partition along the inſide of the noſe, the maxillary ſinuſes or cavities of the cheek-bones on each ſide the noſe, and the frontal ſinuſes or cavities above the orbits of the eyes: that the viſcera, as liver, lungs, &c. of glandered horſes, are in general exceeding ſound; and conſequently that the ſeat of this diſorder is not in thoſe parts, as has been aſſerted by moſt authors. But on nicely examining by diſſection the heads of ſuch horſes, he found the cavities above mentioned more or leſs filled with a viſcous ſlimy matter; and the membrane which lines both them and the noſtrils inflamed, thickened, and corroded with ſordid ulcers, which in ſome caſes had eat into the bones.

It is a curious remark of our author, that the ſublingual glands, or the kernels ſituated under the jaw-bone, which are always ſwelled in this diſtemper, do not diſcharge their lymph into the mouth, as in man, but into the noſtrils; and that he conſtantly found their obſtruction agreed with the diſcharge: if one gland only was affected, then the horſe diſcharged from one noſtril only; but if both were, then the diſcharge was from both.

The ſeat of this diſorder thus diſcovered, the mode of cure he had recourſe to was by trepanning theſe cavities, and taking out a piece of bone, by which means the parts affected may be waſhed with a proper injection, and in fine the ulcers deterged, healed, and dried up; and his ſucceſs, by his own account, was very great.

But as, from the obſervations ſince made by this gentleman, there are different ſpecies of the glanders; ſo the cure of the milder kinds may firſt be attempted by injections and fumigations. "Thus, after taking cold, ſhould a horſe for 15 or 20 days diſcharge a limpid fluid or whitiſh matter from one or both noſtrils, the glands under the jaw rather growing harder than diminiſhing, we may expect it will degenerate into a true glanders. To prevent which, after firſt bleeding, and treating him as we have directed for a cold, let an emollient injection, prepared with a decoction of lintſeed, marſh-mallows, elder, camomile flowers, and honey of roſes, or ſuch like, be thrown up as far as poſſible with a ſtrong ſyringe, and repeated three times a-day: ſhould the running not leſſen or be removed in a fortnight by the uſe of this injection, a reſtringent one may now be

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Glanders. prepared with tincture of roſes, lime-water, &c. and the noſtrils fumigated with the powders of frankincenſe, maſtich, amber, and cinnabar, burnt on an iron heated for that purpoſe; the fume of which may eaſily be conveyed through a tube into the noſtrils." Such is the method recommended by Bartlet, which he ſays has been found ſucceſsful when uſed in time. But a more particular courſe of procedure will be afterwards deſcribed, that the reader may have the fulleſt information concerning this moſt difficult diſeaſe.

When the diſorder is inveterate, recourſe muſt be had to the operation above deſcribed, according to the doctrine of M. la Foſſe.

The pretenſions of that gentleman, however, have been lately expoſed with ſeeming juſtice by Mr Taplin; and the following circumſtances quoted from the French farrier's work ſeem ſufficient of themſelves to throw ſuſpicion upon the whole. We are told of three horſes he trepanned, each in two places: the internal parts were conſtantly ſyringed, and they were perfectly recovered; "the wound and perforation filling up in 26 days, the horſes ſuffering no inconvenience from the operation, though after this experiment they were PUT TO DEATH." We are at laſt confidently aſſured, that ſuch operations being performed, "after opening the cavities, ſhould it by probing be diſcovered that the bones are carious (or, in other words, rotten), the beſt way then will be to diſpatch the horſe, to ſave unneceſſary trouble and expence." Which Mr Taplin interprets in plain Engliſh thus: "Deprive the horſe of half his head, in compliment to the pecuniary feelings of the farrier; and if you find the remaining half will not anſwer the purpoſe of the whole, cut his throat, or ſhoot him through the head, to ſave the operator's credit."

Mr Taplin alſo condemns the diſtinction of the diſorder into different ſpecies; and the various ſymptoms that appear, he conſiders as only marking different ſtages of the ſame diſeaſe. The fact according to him appears to be, "that any corroſive matter diſcharged from the noſtrils, and ſuffered to continue for a length of time, ſo as to conſtitute ulcerations and corrode the bones, will inevitably degenerate into and conſtitute the diſeaſe generally underſtood by the appellation of glanders; every ſtagnant, acrimonious, or putrid matter, is poſſeſſed of this property, and more particularly when lodged (or by ſinuſes confined) upon any particular part. Diveſted of profeſſional trick, chicanery, and deception, this is the incontrovertible explanation, whether proceeding from an ulceration of the lungs, or the inveterate glandular diſcharges from the head (where the caſe is of long ſtanding, and the bone carious) they are equally incurable." In this view, therefore, prevention, rather than cure, being the rational object of attention, it remains only to point out ſuch methods as ſeem likely to obviate the diſorder upon the ſlighteſt appearance of its approach, or upon the attack of any other diſeaſe that may be likely to terminate in it.

Where the lungs, then, are the ſeat of diſeaſe, as in the firſt attack of coughs, &c. no better treatment can be purſued than that laid down under the Sections of *Colds* and *Coughs*. But where a ſwelling ſhows that matter is forming under the ears, jaws, or about the root of the tongue, let every poſſible method be taken to produce a ſuppuration and diſcharge of matter; for, in moſt caſes, an external evacuation becomes the criſis, and is greatly preferable to the chance of miſchiefs that may be produced by the morbid matter being abſorbed into the ſyſtem. Glanders.

Should cough, difficulty of breathing, or a great degree of inflammatory heat, attend, draw blood from a remote vein in moderate quantity, to mitigate either of thoſe ſymptoms; and when the ſwellings about the parts have acquired an evident prominence, foment them twice a day, for two or three days, with flannels dipped in the following decoction:

CAMOMILE, wormwood, marſhmallows, and elder flowers, of each a large handful, boiled in three quarts of water for a quarter of an hour, and then ſtrained off. Let the liquor be uſed hot, and apply the herbs warm by way of poultice to the parts.

In two or three days a judgment may be formed whether a ſuppuration is likely to take place. If ſo, the tumors will increaſe in ſize, and feel ſoft and yielding in the middle when preſſed; in which caſe apply the poultice, and proceed as directed above for the Strangles. If, on the contrary, the ſwellings continue hard and immoveable, a running coming on at the noſe; obſerve whether the matter is of a white colour and without ſmell; or is of different tinges, and ſtreaked with blood. The former is a favourable ſign; and in that caſe the treatment may be as directed under the Sections of *Cold* and *Cough*. But if the matter ſhould prove of the latter deſcription, every precaution ought to be inſtantly uſed, to prevent in its infancy what would ſoon become a caſe of much trouble. In the firſt place, therefore, in order to ſoften the viſcid matter in the paſſages, and relax the inflammatory ſtricture of the glands, prepare a vapour bath of roſemary, lavender flowers, ſouthernwood and marjoram (each a handful), boiled in two or three quarts of water. Put this into a pail, and let the horſe's head be fixed over it as near as can be borne, and ſo long as the fumes paſſing up the noſtrils can be ſuppoſed to take effect as an internal fomentation. This operation ſhould be repeated twice every day; and much of the treatment recommended under coughs and ſtrangles with glandular diſcharges from the noſtrils, will at the ſame time appear proper to be obſerved, as being applicable to many of the preſent ſymptoms. Let it be particularly remembered, that, during the whole courſe of management, the head of the horſe is to be kept as warm as poſſible, and in proportion much more ſo than the body, either in a double kerſey hood, or a ſingle external, and a flannel one underneath; as nothing can contribute more to a ſolution of the humours and promotion of their diſcharge, than a critical relaxation of the pores, particularly upon the very ſeat of diſeaſe.

In caſe the diſcharge ſhould continue to increaſe in quantity and virulence, becoming ſtill more diſcoloured, and its ſmell very offenſive; beſides continuing the fumigation, let half a gill of the following injection (milk warm) be thrown up either noſtril (or both if the matter ſhould be ſo diſcharged) with a ſtrong forcible ſyringe, three or four times a-day.

LINSEED,

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Glanders.

Linseed, an ounce; camomile and elder flowers, each half an ounce; water, three pints. Boil for a few minutes; then strain off, and add to the liquor four ounces of *mel Ægyptiacum*, mixing well together at each time of using.

If the matter should notwithstanding grow so malignant as to threaten a corrosion and rottenness of the bones; besides a diligent use of both fumigation and injection, a course of mercurial unction must be immediately entered upon. Mr Taplin directs to "Let two, or at most three drams of the strong mercurial ointment (prepared as directed under *Strangles*) be very well rubbed into the glandular tumors, under the throat or ears, every night for a fortnight; first taking away with the scissars all superfluous or long hairs, that the mercurial particles may be with more certainty absorbed by the vessels, and taken into the circulation. If the owner of a horse labouring under this difficulty wishes, like a drowning man, to avail himself of another twig, he may call in the aid of mercurial physic, or alterative medicines."

Upon the whole of this subject: As long as the attack continues in its early and simple state, let unremitting attention be paid to the treatment recommended under the different heads of those symptoms that are then most predominant: but should that treatment, after a fair trial, prove insufficient to resist the progress of the disease, the glands under the jaw-bone "continuing during the whole course inflexible, the matter first tinged with blood, then becoming deep in colour and most offensive in smell, the carcase emaciated, and the whole frame sinking under universal depression, the first loss (says Mr Taplin) will be ultimately best, in a resignation of his hide to the collar-maker, and his remains to the hounds. As to the operation of trepanning, so plausibly held forth with all its specious advantages, I shall openly and fairly enter my protest against it. For what does the whole amount to more than this?—If the horse should absolutely recover, and (what is still more unlikely) become adequate to the very purposes he was destined to before the attack; when the long illness, support, attendance, and farrier's bill, are balanced against his value, he must be a most excellent horse, and very much above the line of mediocrity, to have the credit-account in his favour. In fact, the most probable conjecture is, his inevitable dissolution: but should he miraculously escape from both the distemper and operator, ranking under the denomination of *a cured horse*, he may, perhaps, be then qualified to linger out a wretched existence in some park or pasture, but never enabled to encounter labour or fatigue."

Taplin's Stable Directory, p. 96.

Ibid, p. 305.

Sect. XVII. *Of the Colic or Gripes, and Pains in the Bowels, from sudden Accidents.*

There seems to be no distemper so little understood by the common farrier as the colic or gripes in horses, one general remedy or method serving them in all cases: but as this disorder may be produced by very different causes, the method of cure must also vary; otherwise the intended remedy, injudiciously applied, will not only aggravate the complaint, but make it fatal. We shall divide this disorder into three different species: the flatulent or windy, the bilious or inflammatory, and the dry gripes; each of which we shall distinguish by their different symptoms, and then point out the proper remedies. Colic or Gripes, &c.

1. The flatulent or windy colic may in general be readily distinguished by the rumbling of the confined air through the intestines: The horse is often lying down, and as suddenly rising again with a spring; he strikes his belly with his hinder feet, stamps with his fore-feet, and refuses his meat; when the gripes are violent, he will have convulsive twitches, his eyes be turned up and his limbs stretched out as if dying, his ears and feet being alternately very hot and cold; he falls into profuse sweats, and then into cold damps; strives often to stale, and turns his head frequently to his flanks; he then falls down, rolls about, and often turns on his back; this last symptom proceeds from a stoppage of urine, that almost always attends this sort of colic, which may be increased by a load of dung pressing on the neck of the bladder.

These are the general symptoms of colic and gripes from wind, drinking cold water when hot, and when the perspirable matter is retained, or thrown on the bowels by catching cold; in all which cases they are violently distended. Cribbing horses are more particularly subject to this complaint, by reason they are constantly sucking in great quantities of air.

The first intention is to empty the strait gut with a small hand dipped in oil, which frequently makes way for the confined wind to discharge itself; and by easing the neck of the bladder, the suppression of urine is taken off, and the horse stales and gets ease.

The following ball and glyster seldom fail of giving relief in these cases.

Take Strasburgh or Venice turpentine, and juniper-berries pounded, of each half an ounce; salt-prunella or saltpetre, an ounce; oil of juniper, one dram; salt of tartar, two drams: Make into a ball with any syrup; it may be given whole, and washed down with a decoction of juniper-berries, or a horn or two of ale.

If the horse does not break wind, or stale plentifully, he will find no relief: therefore in an hour or two give him another ball, and add to it a dram of salt of amber; which may be repeated a third time, if found necessary. During the fit the horse may be walked and trotted gently; but should by no means be harassed beyond his ability, or dragged about till he is jaded.

The following glyster may be given, between the balls, or alone, and repeated occasionally.

Take camomile flowers two handfuls; anise, coriander, and fennel seeds, of each an ounce; long pepper half an ounce; boil in three quarts of water to two; and add Daffy's elixir, or gin, half a pint; oil of amber half an ounce, and oil of camomile eight ounces.

The signs of a horse's recovery, are his lying quiet, without starting or tumbling, and his gathering up his legs, and ceasing to lash out; and if he continues an hour in this quiet posture, you may conclude all danger over.

2. The next species of colic is the bilious or inflammatory. This, besides most of the preceding symptoms, is attended with a fever, great heat, panting, and dryness of the mouth: the horse also generally

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Colic or Gripes, &c.

rally throws out a little looſe dung, with a hot ſcalding water; which, when it appears blackiſh, or of a reddiſh colour, and fetid ſmell, denotes an approaching mortification.

In this caſe the horſe ſhould immediately be bled to the quantity of three quarts; and it ſhould be repeated, if the ſymptoms do not abate in a few hours. The emollient glyſter, with two ounces of nitre diſſolved in it, ſhould be thrown up twice a day, to cool the inflamed bowels; plenty of gum-arabic water ſhould be taken; and a pint of the following drink given every two or three hours till ſeveral looſe ſtools are procured, and then it ſhould be given only night and morning till the diſorder is removed.

TAKE ſenna three ounces, ſalt of tartar half an ounce; infuſe in a quart of boiling water an hour or two; then ſtrain off, and add two ounces of lenitive electuary, and four of Glauber's ſalts.

If this diſorder is not removed by theſe means, but the inflammation and fever increaſe, attended with a diſcharge of the fleſh-coloured water above deſcribed, the event will moſt probably be fatal; and the chief thing to be depended on now, muſt be a ſtrong decoction of Jeſuit's bark, given to the quantity of a pint every three hours, with a gill of red port-wine.

A quart of the ſame may be uſed for a glyſter, with two ounces of Venice turpentine, diſſolved with the yolks of two eggs, an ounce of diaſcordium, and a pint of red wine, and given twice a-day: if the horſe recovers, give two or three mild rhubarb purges.

3. The dry gripes, or colic which ariſes often from coſtiveneſs, is diſcovered by the horſe's frequent and fruitleſs motion to dung, the blackneſs and hardneſs of the dung, the frequent and quick motion of his tail, the high colour of his urine, and his great reſtleſſneſs and uneaſineſs.

In this caſe the ſtrait gut ſhould be examined and emptied with a ſmall hand oiled properly for that purpoſe; the emollient oily glyſter (p. 116. col. 2. par 3.) ſhould be thrown up twice a day; and the above purging drink given, till the bowels are unloaded, and the ſymptoms removed.

The diet for a horſe in the gripes ſhould be ſcalded bran, warm water-gruel, or white water, made by diſſolving four ounces of gum-arabic in a quart of water, and mixing it with his other water.

4. From this hiſtory and diviſion of gripes and colics, with their different treatment, it appears how abſolutely neceſſary it is they ſhould be well underſtood, in order to be managed ſkilfully: it is plain, too, that violent hot medicines ſhould in every ſpecies of this diſorder be guarded againſt, and given with great caution and diſcretion, even in the firſt kind of flatulent colic, where indeed they can only be wanted; yet too often, when prepared by the farriers with oil of turpentine, geneva, pepper, and brine, &c. they even increaſe that diſorder, by ſtimulating the neck of the bladder, too forcibly heating the blood, and inflaming the bowels, till a mortification is brought on them. Theſe are, in general, the conſtant appearances of horſes that die of this diſorder; whoſe bowels being examined for that purpoſe, have been found inflamed, full of red and livid ſpots, ſometimes quite black, criſped with extreme heat, and rotten.

Lax and Scouring, &c.

SECT. XVIII. *Of the Lax and Scouring, with other Diſorders of the Stomach and Bowels.*

IT is ſometimes a nice matter to form a proper judgment when to controul or encourage a looſeneſs; but theſe general rules may be a direction: If a healthy full horſe, on taking cold, or upon hard riding, overfeeding, eating unwholeſome food, or with a ſlight fever, ſhould have a moderate purging, by no means think of ſtopping it; but rather encourage it with an open diet, and plenty of warm gruel: but if it continues long, with gripings, the mucus of the bowels coming away, and the horſe loſing his appetite and fleſh, recourſe muſt be had to proper medicines. If he voids great quantities of ſlime and greaſy matter, give him the following drench, and repeat it every other day for three times.

TAKE lenitive electuary and cream of tartar of each four ounces, yellow roſin finely powdered one ounce, and four ounces of ſweet oil; mix with a pint of water-gruel.

The following alterative ball alone has been found ſucceſsful for this purpoſe when given twice a-week, with ſcalded bran and warm gruel.

TAKE ſocotorine aloes half an ounce, diapente one ounce; make into a ball with the juice of Spaniſh liquorice diſſolved in water, and a ſpoonful of oil of amber. To this may be added two drams of myrrh, and a dram of ſaffron, and (where it can be afforded) half an ounce of rhubarb.

When the purging is attended with a fever, rhubarb ſhould firſt be given to the quantity of half an ounce, with an ounce and half of lenitive electuary; at night, after the working, give half an ounce or more of diaſcordium in a pint of red wine mulled with cinnamon; and repeat it every day, and the rhubarb-ball once in two or three.

But if the diſtemper increaſes, the horſe's flanks and belly look full and diſtended, and he appears griped and in pain, let this glyſter be given, and the quantity of diaſcordium increaſed an ounce in his night-drink.

TAKE camomile flowers one handful, red roſes half a handful, pomegranate and balauſtines of each an ounce; boil in two quarts of water to one; ſtrain off, and diſſolve it in two or three ounces of diaſcordium and one of mithridate; to which may be added a pint of port wine. Repeat it once a-day.

If the flux continues violent, give an ounce of rock-alum, with an ounce and a half of bole, twice a-day; or, diſſolve double this quantity with two ounces of diaſcordium, and the cordial ball, in two quarts of hartſhorn drink; to which may be added a pint of port; and give the horſe, three or four times a-day, a pint of this drink. For this purpoſe alſo a ſtrong decoction of oak-bark may be given, with either of the above remedies, and to the ſame quantity; even by itſelf, it will be found on trial no inconſiderable remedy.

When the diſcharge is attended with an acrid mucus or ſlime, the griping and pains are very ſevere, the common lining of the bowels being waſhed away; in this

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Lax and Scouring, &c.

this caſe the following glyſter ſhould frequently be injected warm.

TAKE of tripe-liquor or thin ſtarch two quarts, oil of olives half a pint, the yolk of ſix eggs well broke, and two or three ounces of coarſe ſugar.

Some horſes, having naturally weak ſtomachs and bowels, throw out their aliment undigeſted; their dung is habitually ſoft and of a pale colour; they feed poorly, and get no fleſh: to remedy this complaint, give the following purge two or three times; and then the infuſion to the quantity of a pint every morning.

TAKE ſocotorine aloes ſix drams, rhubarb powdered three drams, myrrh and ſaffron each a dram; make into a ball with ſyrup of ginger.

Infuſion.—TAKE zedoary, gentian, winter's-bark, and orange-peel, of each two ounces; pomegranate-bark and balauſtines of each an ounce; camomile-flowers and centaury, each a handful; cinnamon and cloves, each an ounce: infuſe in a gallon of port or ſtrong beer.

The bloody-flux is a diſtemper horſes are not very ſubject to; however, as it ſometimes does occur, whenever blood is diſcharged, attended with gripings and great pain in the bowels, if the flux is not ſpeedily reſtrained the horſe probably may be ſoon loſt: we recommend therefore the following glyſter and drink for that purpoſe.

TAKE oak-bark four ounces, tormentil-root two ounces, burnt hartſhorn three ounces; boil in three quarts of forge-water to two; ſtrain off, and add two ounces of diaſcordium, four ounces of ſtarch, and half a dram of opium.

A glyſter may alſo be prepared with the ſame quantity of fat broth, ſtarch, and opium, in order to plaſter over the coats of the bowels, and abate their violent irritations. Alſo,

TAKE ſoft chalk two ounces, mithridate or diaſcordium one ounce, powder of Indian-root half a dram, liquid laudanum 50 or 60 drops; diſſolve in a pint of hartſhorn drink, and add to it four ounces of cinnamon-water and red wine; give it twice a-day.

Gum-arabic diſſolved in hartſhorn drink, or in common water, ſhould be the horſe's uſual drink.

When horſes are apt to be coſtive, from whatever cauſe it ariſes, gentle openers ſhould be given; ſuch as cream of tartar, Glauber's ſalts, and lenitive electuary: four ounces of any two of theſe diſſolved in warm ale, whey, or water, given every other morning for two or three times, will anſwer this purpoſe; eſpecially if aſſiſted by an oily emollient glyſter, prepared with a handful of ſalt. Scalded bran or barley, with an ounce of fenugreek and linſeed, occaſionally given, will prevent this complaint: but where it is conſtitutional, and proceeds from the power and force of digeſtion in the ſtomach and guts, as ſometimes happens, and the horſe is in perfect health, no inconvenience will ariſe from it; and it is obſerved that ſuch horſes are able to endure great fatigue and labour.

SECT. XIX. *Of Worms and Botts.*

AUTHORS have deſcribed three different ſorts of worms that affect horſes, *viz.* *Botts*, which young horſes are often troubled with in the ſpring; the *Rotundi*, or thoſe reſembling earth-worms; and the *Aſcarides*, or thoſe about the ſize of the largeſt ſewing needle, with flat heads.

Worms and Botts.

The botts which breed in the ſtomachs of horſes, and are ſometimes the cauſe of convulſions, appear to be very large maggots, compoſed of circular rings, with little ſharp prickly feet along the ſides of their bellies (like the feet of hog-lice), which by their ſharpneſs (like the points of the fineſt needles) ſeem to be of uſe to faſten them to the part where they breed and draw their nouriſhment, and to prevent their being looſened from ſuch adheſion before they come to maturity. The eggs from whence thoſe botts are produced, are diſperſed into cluſters all round the lower orifice of the ſtomach, and are laid under the inner coat or thin membrane of the ſtomach; ſo that when the animals come to form and life, they burſt through this inner coat with their breech and tail ſtraight outwards, and their trunks ſo fixed into the muſcular or fleſhy coat of the ſtomach, that it ſometimes requires a good pull to diſengage them; from the blood of this laſt coat they draw their nouriſhment, which they ſuck like ſo many leeches, every one ulcerating and purſing up the part where it fixes like a honey-comb; and they often make ſuch quick havock as to deſtroy the horſe.

The ſymptoms of worms are various. The botts that many horſes are troubled with in the beginning of the ſummer, are always ſeen ſticking on the ſtrait gut, and are often thruſt out with the dung, with a yelloviſh coloured matter like melted ſulphur: they are no ways dangerous there; but are apt to make a horſe reſtleſs and uneaſy, and rub his breech againſt the poſts. The ſeaſon of their coming is uſually in the months of May and June; after which they are ſeldom to be ſeen, and rarely continue in any one horſe above a fortnight or three weeks. Thoſe that take their lodgment in the ſtomach, are extremely dangerous by cauſing convulſions; and are ſeldom diſcovered by any previous ſigns before they come to life, when they throw a horſe into violent agonies. The other kinds are more troubleſome than dangerous; but are known by the following ſigns: the horſe looks lean and jaded, his hair ſtares as if he was ſurfeited, and nothing he eats makes him thrive; he often ſtrikes his hind-feet againſt his belly; is ſometimes griped, but without the violent ſymptoms that attend a colic and ſtrangury; for he never rolls and tumbles, but only ſhows uneaſineſs, and generally lays himſelf down quietly on his belly for a little while, and then gets up and falls a feeding; but the ſureſt ſign is when he voids them with his dung.

For the cure of botts in the ſtomach, calomel ſhould firſt be given in large quantities, and repeated at proper intervals; Æthiop's mineral, or ſome of the undermentioned forms, may be given afterwards.

But botts in the ſtrait gut may be cured by giving the horſe a ſpoonful of ſavin, cut very ſmall, once or twice a-day in his oats or bran, moiſtened; and three or four cloves of garlic may be added to advantage. Give alſo an aloetic purge between whiles; the following ſtands recommended.

TAKE fine ſocotorine aloes, ten drams; freſh jalap, one dram; ariſtolochia, or birthwort, and myrrh powdered, of each two drams; oil of ſavin and amber,

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Yellows, or Jaundice.

amber, of each one dram; ſyrup of buckthorn enough to form into a ball.

But as the ſource of worms in general proceeds from a vitiated appetite and a weak digeſtion, recourſe muſt firſt be had to mercurials, and afterwards to ſuch things as are proper to ſtrengthen the ſtomach, promote digeſtion, and by deſtroying the ſuppoſed ova, prevent the regeneration of theſe animals. Thus, two drams of calomel may be given with half an ounce of diapente, and mixed up with conſerve of wormwood, overnight; and the next morning the above purge: theſe may be repeated ſix or eight days. Or the following mercurial purge may be given, which will be leſs troubleſome, and no leſs efficacious.

TAKE crude quickſilver two drams, Venice turpentine half an ounce; rub the quickſilver till no gliſtening appears; then add an ounce of aloes, a dram of grated ginger, 30 drops of oi of ſavin, and a ſufficient quantity of ſyrup of buckthorn to make a ball.

One of theſe balls may be given every ſix days, with the uſual precautions in regard to mercurial phyſic; and the following powder intermediately.

TAKE powdered tin and Æthiop's mineral of each half an ounce: give every night in a maſh, or among his corn.

The various preparations of antimony and mercury muſt be given ſeveral weeks together, in order to get entire riddance of theſe vermin. The Æthiop's mineral may be given to the quantity of half an ounce a-day; the mercurius alkaliſatus to two drams a-day, incorporated with a bit of cordial ball. The cinnabar powders, as directed in the farcy, are no leſs effectual: and when worms are bred from high feeding, or unwholeſome food; rue, garlic, tanſy, ſavin, box, and many other ſimples, may be given ſucceſsfully; being for that purpoſe mixed with their food; as alſo cut tobacco, from half an ounce to an ounce a-day.

SECT. XX. *Of the Yellows, or Jaundice.*

HORSES are frequently ſubject to this diſtemper; which is known by a duſky yellowneſs of the eyes; the inſide of the mouth and lips, the tongue, and bars of the roof of the mouth, looking alſo yellow. The horſe is dull, and refuſes all manner of food; the fever is ſlow, yet both that and the yellowneſs increaſe together. The dung is often hard and dry, of a pale yellow, or light pale green. His urine is commonly of a dark dirty brown colour; and when it has ſettled ſome time on the pavement, it looks red like blood. He ſtales with ſome pain and difficulty; and if the diſtemper is not checked ſoon, grows delirious and frantic. The off-ſide of the belly is ſometimes hard and diſtended; and in old horſes, when the liver has been long diſeaſed, the cure is not practicable, and ends fatally with a waſting diarrhœa: but when the diſtemper is recent, and in young horſes, there is no fear of a recovery, if the following directions are obſerved.

Firſt of all bleed plentifully; and give the laxative glyſter (p. 120. col. 2. laſt par.) as horſes are apt to be very coſtive in this diſtemper; and the next day give him this purge:

TAKE of Indian rhubarb powdered one ounce and a half, ſaffron two drams, ſocotorine aloes ſix drams, ſyrup of buckthorn a ſufficient quantity.

If the rhubarb ſhould be found too expenſive, omit it, and add the ſame quantity of cream of tartar, and half an ounce of Caſtile ſoap, with four drams more of aloes. This may be repeated two or three times, giving intermediately the following balls and drink. Diſorders of the Kidneys, &c.

TAKE of Æthiop's mineral half an ounce, millepedes the ſame quantity, Caſtile ſoap one ounce; make into a ball, and give one every day, and waſh it down with a pint of the following decoction.

TAKE madder-root and turmerick of each four ounces, burdock-root ſliced half a pound, Monk's rhubarb four ounces, liquorice ſliced two ounces; boil in a gallon of forge-water to three quarts; ſtrain off, and ſweeten with honey.

Balls of Caſtile ſoap and turmerick may be given alſo for this purpoſe to the quantity of three or four ounces a-day, and will in moſt recent caſes ſucceed.

By theſe means the diſtemper generally abates in a week, which may be diſcovered by an alteration in the horſe's eyes and mouth; but the medicines muſt be continued till the yellowneſs is entirely removed.

Should the diſtemper prove obſtinate, and not ſubmit to this treatment, you muſt try more potent remedies, viz. mercurial phyſic, repeated two or three times at proper intervals; and then the following balls.

TAKE ſalt of tartar two ounces, cinnabar of antimony four ounces, live millepedes and filings of ſteel of each three ounces, ſaffron half an ounce, Caſtile or Venice ſoap half a pound; make into balls, the ſize of a pullet's egg, with honey; and give one night and morning, with a pint of the above drink.

It will be proper, on his recovery, to give two or three mild purges; and, if a fat full horſe, to put in a rowel.

SECT. XXI. *Of the Diſorders of the Kidneys and Bladder.*

THE ſigns of the kidneys being hurt or affected are, a weakneſs of the back and loins, difficulty of ſtaling, faintneſs, loſs of appetite, and deadneſs in the eyes; the urine is thick, foul, and ſometimes bloody, eſpecially after a violent ſtrain. A horſe diſeaſed in his kidneys can ſeldom *back*, that is, move ſtraight backwards, without pain, which is viſible as often as he is put to the trial: the ſame thing is obſervable indeed in horſes whoſe backs have been wrung and wrenched; but with this difference, that in the latter there is ſeldom any defect or alteration in the urine, except that it is higher coloured.

The conſequences of a diſordered ſtate of the urinary organs are principally two; ſtrangury and diabetes.

1. *Strangury*, or an obſtruction of urine, may ariſe from different cauſes. When it is not owing to wind, or hardened dung preſſing upon the neck of the bladder (as was obſerved in the ſection on *Colics*), it may proceed from inflammation in the bladder or kidneys, ulcerations there, or ſpaſms upon any particular part. When owing to inflammation or ſpaſm, the general indications of cure are, to leſſen the ſtricture upon the parts; to reduce the inflammation; and to promote the evacuation of urine: the firſt of which intentions may be anſwered by a moderate loſs of blood; the ſe-

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Disorders of the Kidneys, &c.

cond, by the use of internal emollients; and the third, by gentle stimulants and mild diuretics.

In strangury from inflammation or spasm in the parts, the horse makes frequent motions to stale, stands wide and straddling, appears full in the flank, and somewhat dejected. The first measure, as already observed, is bleeding; and that more or less plentifully according to the urgency of the symptoms. In a convenient time after this operation, Mr Taplin recommends to throw up the following emollient glyster:

Stable Directory, p. 363.

"TAKE of thin gruel three pints, nitre two ounces, gum arabic one ounce and an half, olive oil four ounces; let it be injected moderately warm, and retained in the body as long as possible.

"So soon after this glyster as the horse is inclined by appetite to receive it, give a mash of two parts malt and one bran, they having been scalded together and stirred till of a moderate warmth; after this, if the subject has not staled in consequence of bleeding, glyster, and mash, have the following balls expeditiously prepared to forward the evacuation:

"TAKE Castile soap ten drams, sal prunella one ounce, camphire two drams, aniseed powder six drams, oil of juniper one dram and an half, syrup of marshmallows sufficient to make the mash; which divide into two equal parts, giving one in six hours after the other, if the former is not successful.

"These are very safe, mild, and efficacious, in general producing the desired effect without any uneasy sensations. Where a drink is preferred, as coming into a more applicable mode of administration, the following will prove equally serviceable:

"TAKE juniper berries (bruised) two ounces; boil in a pint and a half of water for some time, then strain (to produce by squeezing the berries three quarters of a pint); to this add of nitre and gum Arabic (in powder) each an ounce.

"This drink, or the above ball, to be repeated at distinct periods of four hours each (if a repetition of the first at the end of six hours does not effect the desired purpose), till relief is obtained by plentiful evacuations."

As a suppression of urine arises sometimes from an inflammation of the parts; so at others from a paralytic affection, particularly of the kidneys, disabling them in their office of separating the urine from the blood: in this latter case, a general suppression taking place, the bladder is usually empty, so that a horse will make no motion to stale; and if he survives a few days in this condition, his body will swell to a great degree, break out in blotches all over, and death will soon close the scene.

Strangury sometimes also arises from an ulceration of the parts; which is a case almost as desperate as the preceding. The symptoms are: A visible disquietude; the evacuation not totally suppressed, being only at times obstructed; the urine frequently altering its appearance, being sometimes thick, depositing a turbid sediment as if impregnated with membranous matter; and at other times tinged with blood, the evident effect of a corroded solution of the diseased part. In this instance the following balls or drink are recommended by Mr Taplin as the only probable means of relief.

Molten-grease.

Ibid. p 368.

"TAKE of myrrh one ounce, Castile soap and Locatelli's balsam each three ounces, nitre and aniseed (in powder) each two ounces, balsam of Peru six drams. Mix together with syrup of marshmallows, and divide into six balls, giving one every morning.

In case spasm of the parts be also suspected, the following ball may be given, and repeated at such times as the circumstances of the case may render proper.

Ibid. p. 369.

"TAKE of Castile soap half an ounce; nitre, rosin, and compound powder of gum tragacanth, each two drams; opium (in powder) ten grains; oil of juniper 30 drops.—Mix.

"The following drink may be substituted with equal effect if a liquid form is preferred:

"TAKE thin gruel three quarters of a pint, gum arabic and nitre (in powder) each one ounce, liquid laudanum three drams.—Mix.

"This (as the ball above) may be occasionally repeated."

2. Horses subject to a *diabetes*, or profuse staling, if old, or of a weak constitution, are seldom cured; they soon lose their flesh and appetite, grow feeble, their coat staring, and they die rotten. Of a young horse there are more hopes; but he must not be indulged with too much water or moist food. Give him the following:

TAKE jesuits bark four ounces, bistort and tormentil-root of each two ounces; boil in two gallons of lime-water to the consumption of half, and give a pint three times a-day.

As this disorder generally proceeds from too violent exercise, over-straining, &c. repeated bleedings in small quantities are absolutely necessary, till the mouths of the vessels close up.

SECT. XXII. *Of Molten-grease.*

BY molten-grease is meant a fat or oily discharge with the dung; and it arises from a colliquation or melting down of the fat of a horse's body by violent exercise in very hot weather. It is always attended with a fever, heat, restlessness, starting and tremblings, great inward sickness, shortness of breath, and sometimes with the symptoms of a pleurisy. His dung will be extremely greasy, and he will fall into a scouring; his blood will have a thick skin or fat over it when cold, of a white or yellow hue, but chiefly the latter; the congealed part or sediment is commonly a mixture of size and grease, which makes it so extremely slippery, that it will not adhere to the fingers, and the small portion of serum feels also slippery and clammy. The horse soon loses his flesh and fat, which probably is dissolved and absorbed into the blood; and those that survive this shock commonly grow hide-bound for a time, their legs swelling both before and behind, and continue in this state till the blood and juices are rectified; and if this is not done effectually, the farcy or some obstinate surfeit generally follows, very difficult to remove.

In the first place bleed plentifully, and repeat it for

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Hide-bound, Surfeits, &c.

two or three days ſucceſſively in ſmaller quantities; two or three rowels ſhould alſo be immediately put in, and the cooling emollient glyſters (p. 121. col. 1. par. 1, 2.) daily thrown up to abate the fever, and drain off the greaſy matter from the inteſtines. By the mouth give plenty of warm water or gruel, with cream of tartar or nitre, to dilute and attenuate the blood, which in this caſe is greatly diſpoſed to run into grumes, and endanger a total ſtagnation.

When the fever is quite gone off, and the horſe has recovered his appetite, gentle aloetic purges ſhould be given once a-week, for a month or ſix weeks, in order to bring down the ſwelled legs. To this end give the following; which, repeated for ſome time, will entirely remove this diſorder.

TAKE of ſocotorine aloes ſix drams, of gum guaiacum powdered half an ounce, of diaphoretic antimony and powder of myrrh each two drams; make into a ball with ſyrup of buckthorn.

Theſe will ſeldom take a horſe from his buſineſs above two or three days in a week; neither will he loſe his fleſh or appetite with them, but on the contrary mend in both; which cannot be obtained by any other method of purging, and gives this greatly the preference in many caſes.

SECT. XXIII. *Of Hidebound, Surfeits, and Mange.*

1. THE ſigns of *Hidebound* are, "a want of flexibility in the ſkin, which is pervaded by a general ſtiffneſs that ſeems to form an entire adheſion to the fleſh, without the leaſt partial ſeparation or diſtinction. There is a kind of duſty ſcurf, plainly perceived underneath the hair, that raiſes it up in different parts; and, giving it another hue, the coat in many places forms an appearance of two or three colours; conveying, even in this trifling circumſtance, a very forcible idea of poverty in both food and raiment. The horſe is generally languid, dull, heavy, and weak; his excrement is dark, foul, and offenſive; he ſweats much upon very moderate exertions; then his coat ſtares, the hair turns different ways (which in its effluvia is diſagreeable), and affords evident proof of weakneſs and debilitation.

Stable Diſcipline, p. 114.

Bad food and want of ſtable care are, in general, the only probable reaſons that can be aſſigned for this complaint. Long lank graſs in low ſwampy land in autumn, and muſty hay or bad oats at any ſeaſon, may in ſome degree allay the hunger, but not gratify the appetite; for, being in itſelf deſtitute of the effect and quality of ſuperior food, no nutritive contribution can be conveyed for the generating of blood or formation of fleſh. The ſources for the ſupply of chyle being thus obſtructed, the lymphatics are deprived of their due proportion of nutritive fluid that ſhould paſs through theſe ſmaller veſſels; and they become not only in ſome meaſure contracted, but in a great degree inactive, which, with the want of proper external care and dreſſing, contribute to an almoſt univerſal obſtruction of the cutaneous pores. Theſe, from the preternatural debilitation of the general ſyſtem, are thrown open by the moſt moderate exerciſe.

In reſpect to its cure very few directions will be neceſſary, the caſe being no more than a temporary inconvenience, rather than a diſeaſe. Therefore, by way of affording ſome little change to the circulation, take away a ſmall quantity of blood; and in three or four hours after, increaſe its *impetus* by a maſh of malt, oats, and bran, equal parts. Continue this maſh every night for a fortnight, ſtirring in two ounces of flour of brimſtone every other night; and for his other feeds (morning and noon) give equal parts of oats and bran, with half a pint of old beans in each, to prevent relaxing the body too much by the maſhes. At the ſame time, regular and ſubſtantial dreſſing, air, exerciſe, ſound oats, ſweet hay, and good ſoft water, will greatly contribute to promote the cure. And when by theſe means he has viſibly improved in hide, coat, and condition, let him have twice in a week a bruſhing gallop, to produce a moderate ſweat and promote the circulation; taking great care not to let him ſtand ſtill till he is perfectly cool; when his dreſſings ſhould be thoroughly gone through with attention, care, and perſeverance, every night and morning. If this method ſhould be unattended with ſucceſs, there will be reaſon to ſuſpect ſome unknown cauſe lurking behind; in which caſe go through a mild courſe of phyſic, feeding well between the doſes.

2. Of *Surfeits*, according to Mr Taplin, there are two kinds, originating from different cauſes: One being no more than a very advanced ſtage of the caſe laſt deſcribed; which being long neglected, all its ſymptoms increaſe, till the entire maſs of blood being at laſt affected, the virulence of the diſorder diſplays itſelf upon the ſurface of the body.

The other kind of ſurfeit, differing from the former in cauſe, but very little in effect, is that where, from ignorance or inattention, a horſe is ſuffered to drink immoderately of cold water, when in a violent perſpiration, and the blood conſequently in the higheſt degree of circulation.

The circulating fluid being ſo inſtantaneouſly checked by the influence of the frigid element and the ſudden contraction of the ſolids, the craſſamentum becomes immediately thickened and inflamed; while the ſerum or watery part, ſeparating from the other, extravaſates itſelf; and, by an effort of nature, is propelled to the ſkin for tranſpiration, where the pores (having been inſtantly collapſed at the time of the water's taking effect) are ſo cloſely obſtructed that its paſſage to the ſurface is rendered impracticable. In this ſituation it becomes united with the perſpirable matter already confined there; and is, in the courſe of time, compelled by the progreſs of internal inflammation to make its way through the ſkin; upon which it at laſt appears in a variety of forms and different ſymptoms, aſſuming diſtinct degrees of malignancy, according to the ſtate, habit, and conſtitution of the ſubject at the time of attack.

Such, in ſubſtance, is Mr Taplin's account of this diſorder. The indications of cure are, To reſolve the inflammatory crudities, remove cutaneous obſtruction, correct the acrimony of the blood, and gently quicken the circulation. The better to effect theſe, he directs to take away a moderate quantity of blood, that the impetus may be encouraged; to open the body with a few warm maſhes; and according to the mildneſs or in-

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inveteracy of its appearance, to give either two or three mercurial purges, compoſed of the following ingredients.

Barbadoes aloes one ounce, jalap (in powder) three drams; calomel, cream of tartar, Caſtile ſoap, and ginger (in powder) of each two drams; with ſyrup of buckthorn ſufficient to make a ball.

The doſes muſt be given at proper intervals; particular care being all the while taken to guard againſt cold on account of the mercury contained in the compoſition. In three days after the laſt doſe, a courſe of alteratives muſt be entered upon, the medicine compoſed as follows.

Antimony levigated and ſulphur each half a pound, Æthiop's mineral and cream of tartar each four ounces. Theſe are to be mixed well together, and divided into twelve equal parts of two ounces each, for twelve doſes; one of which muſt be given every night with the feed of corn; the latter being firſt ſprinkled with water, the better to retain the powders.

Theſe muſt be continued with the utmoſt punctuality for a month; during all which time let there be alſo given two ounces of nitre every morning in a pail of ſoft water. Should any trifling eſchars, ſcabs, or excoriations, prove obſtinate upon any part of the body, they may be waſhed with equal parts of lye (procured from the ſoap boilers) and lime-waters.

If in the courſe of a month no conſiderable advantage ſhould be produced by the above preſcriptions, the doſes muſt be gradually increaſed from two ounces to two and an half, and in another week to three ounces for each doſe, of both the compoſition and the nitre.

3. *Mange* is a diſtemper ſo univerſally known as to render a particular deſcription unneceſſary. It proceeds chiefly from poor feeding: hence it is very little ſeen amongſt horſes of any eſtimation; but is almoſt entirely confined to the lower claſs of ſtables and proprietors.

In a mangy horſe the ſkin is generally tawny, thick, and full of wrinkles, eſpecially about the mane, the loins, and tail; and the little hair that remains in thoſe parts ſtands almoſt always ſtraight out or briſtly; the ears are commonly naked and without hair, the eye and eye-brows the ſame; and when it affects the limbs, it gives them the ſame aſpect: yet the ſkin is not raw, nor peels off, as in the ſurfeit.

Where this diſtemper is caught by infection, if taken in time it is very eaſily cured: and a ſulphur ointment is recommended as moſt effectual for that purpoſe, rubbed in every day. To purify and cleanſe the blood, give antimony and ſulphur for ſome weeks after. There are a great variety of external remedies for this purpoſe, ſuch as train-oil and gunpowder, tobacco ſteeped in chamber lye, &c. moſt of them evidently improper. Soleſeyl recommends the following, which has been approved.

Take burnt alum and borax in fine powder of each two ounces, white vitriol and verdigris powdered of each four ounces; put them into a clean pot, with two pounds of honey, ſtirring till they are incorporated; when cold, add two ounces of ſtrong aquafortis.

But when this diſorder, as is generally the caſe, is contracted by low feeding and poverty of blood, the diet muſt be mended, and the horſe properly indulged with hay and corn. With this view, there muſt be a conſtant ſupply of warm maſhes, prepared with half malt and half bran, or equal parts of oats and bran, with four ounces of honey diſſolved in each: let theſe be given night and morning, with a feed of dry corn every day at noon. During this treatment (which muſt be continued a week, to ſheathe the acrimony of the fluids, and ſoften the rigidity of the ſkin) give one ounce of ſulphur in each maſh, and one ounce of nitre in water every night and morning. In a week or ten days, when the frame becomes more invigorated, diſcontinue the maſhes, and let the diet be changed to good oats and ſweet hay; giving, in the morning and evening feeds, one of the following powders, intermixed with the corn firſt ſprinkled with water:

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Sulphur and prepared antimony each a pound, rubbed well together in a mortar, and then divided into 24 equal parts for as many doſes.

Or, Antimony levigated and ſulphur of each 12 ounces, liver of antimony and cream of tartar each half a pound.—Theſe to be mixed well together, and divided into the ſame number of doſes as the former.

As to the external treatment; previous to the commencement of the maſhes, procure a pail of warm water and a quarter of a pound of ſoft ſoap (tied up in a linen rag), and with this, forming a ſtrong lather, let every infected part be thoroughly waſhed and cleanſed, ſo that no ſcurf or filth be left upon the ſurface; then rub tenderly dry with a coarſe cloth or ſeparated haybands; and on the following morning begin to rub in upon every part affected a due portion of the following ointment.

Weak mercurial ointment half a pound, quickſilver four ounces, white hellebore (in powder) three ounces, black pepper (in powder) and oil of tartar each one ounce; with olive oil ſufficient to make it of a proper ſoftneſs.

The unction muſt be repeated for ſeven days, ten days, or a fortnight, according to the urgency of the ſymptoms; and let the powders before mentioned, with the nitre alſo, be continued for three weeks or a month. Laſtly, as ſoon as the horſe appears in a condition to bear it, take away a moderate quantity of blood, and give him afterwards two very mild doſes of phyſic.

Sect. XXIV. *Of the Farcin or Farcy.*

The true farcy is properly a diſorder of the blood-veſſels and their contained fluid; by which, when inveterate, the coats and integuments are ſo thickened that they become like ſo many cords.

At firſt, one or more ſmall ſwellings, or round buds like grapes or berries, ſpring out over the veins, and are often exquiſitely painful to the touch; in the beginning they are hard, but ſoon turn into ſoft bliſters, which when broke diſcharge an oily or bloody ichor, and turn into very foul and ill-diſpoſed ulcers. In ſome horſes it appears on the head only; in ſome on the external jugular; in others on the plate-vein, and runs downwards on the inſide of the fore-arm towards the knee, and very often upwards towards the briſket: in ſome the farcy ſhows itſelf on the hind-parts, about the paſterns, and along the large veins on

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Farcin or Farcy.

the inſide of the thigh, riſing upwards into the groin, and towards the ſheath; and ſometimes it makes its appearance on the flanks, and ſpreads by degrees towards the lower belly, where it often becomes very troubleſome.

When the farcy appears on the head only, it is eaſily cured; eſpecially when it is ſeated in the cheeks and fore-head, the blood-veſſels being here ſmall: but it is more difficult when it affects the lips, the noſtrils, the eyes, the kernels under the jaws, and other ſoft and looſe parts, eſpecially if the neck-vein becomes corded. When it begins on the outſide of the ſhoulder or hips, the cure is ſeldom difficult; but when the farcy ariſes on the plate-vein, and that vein ſwells much, and turns corded, and the glands or kernel under the arm-pit are affected, it is hard to cure; but more ſo when the crural veins within ſide of the thigh are corded, and beſet with buds, which affects the kernels of the groin and the cavernous body of the yard. When the farcy begins on the paſterns or lower limbs, it often becomes very uncertain, unleſs a timely ſtop is put to it; for the ſwelling in thoſe dependent parts grow ſo exceſſively large in ſome conſtitutions, and the limbs ſo much disfigured thereby with foul ſores and callous ulcerations, that ſuch a horſe is ſeldom fit for any thing afterwards but the meaneſt drudgery; but it is always a promiſing ſign, wherever the farcy happens to be ſituated, if it ſpreads no further. It is uſual to affect only one ſide at a time; but when it paſſes over to the other, it ſhows great malignancy: when it ariſes on the ſpines, it is then for the moſt part dangerous; and is always more ſo to horſes that are fat and full of blood, than to thoſe that are in a more moderate caſe. When the farcy is epidemical, as ſometimes happens, it riſes on ſeveral parts of the body at once, forms naſty foul ulcers, and makes a profuſe running of greeniſh bloody matter from both noſtrils; and ſoon ends in a miſerable rot.

When the farcy makes its firſt appearance on the head, it riſes on the cheeks and temples, and looks like a net-work, or ſmall creeping twigs full of berries. Sometimes it inflames the eye, and ſometimes little bliſters or buds run along the ſide of the noſe. It ariſes often on the outſide of the ſhoulder, running along the ſmall veins with heat and inflammation; and ſometimes a few ſmall buds appear near the withers, and on the outſide of the hip. In all theſe appearances, the diſeaſe being ſuperficial, and affecting only the ſmaller veſſels, is eaſily conquered by the following method, when taken in time; for the ſimpleſt farcy, if neglected, may degenerate into the worſt ſort.

This diſtemper, then, being of an inflammatory nature, and in a particular manner affecting the blood-veſſels, muſt neceſſarily require large bleeding, particularly where the horſe happens to be fat and full of blood. This always checks the beginning of a farcy, but is of ſmall ſervice afterwards; and if a horſe is low in fleſh, the loſs of too much blood ſometimes proves injurious. After bleeding, let the horſe have four ounces of cream of tartar and lenitive electuary; which may be given every other day for a week, to cool the blood and the body; and then give nitre three ounces a-day for three weeks or a month, and anoint the buds or ſwellings with the following ointment twice a-day.

TAKE ointment of elder four ounces, oil of turpentine two ounces, ſugar of lead half an ounce, white vitriol powdered two drams; mix together in a gally-pot. Farcin or Farcy.

The buds ſometimes by this method are diſperſed, leaving only little bald ſpots which the hair ſoon covers again. When they break and run, if the matter be thick and well digeſted, they will ſoon be well: but in order to confirm the cure, and to diſperſe ſome little lumps which often remain for ſome time on the ſkin without hair, give the liver of antimony for a month; two ounces a-day for a fortnight, and then one ounce a day for the other fortnight: by following this method, a farcy which affects only the ſmall veſſels may be ſtopped in a week or ten days, and ſoon after totally eradicated.

When the farcin affects the larger blood-veſſels, the cure is more difficult; but let it always be attempted early; therefore, on the plate, thigh, or neck-veins appearing corded, bleed immediately on the oppoſite ſide, and apply the following to the corded vein.

TAKE oil of turpentine in a pint-bottle ſix ounces, oil of vitriol three ounces; drop the oil of vitriol into the oil of turpentine by little at a time, otherwiſe the bottle will burſt; when it has done ſmoaking, drop in more oil of vitriol, and ſo on till all is mixed.

This mixture is one of the beſt univerſals in a beginning farcy; but where it is ſeated in looſe fleſhy parts, as flanks or belly, equal parts of the oil of vitriol and turpentine are neceſſary.

Rub the parts firſt with a woollen cloth, and then apply ſome of the mixture over the buds, and wherever there is any ſwelling, twice a-day. Give the cooling phyſic every other day, and then three ounces of nitre every day for ſome time.

When the farcy begins on the flanks, or towards the lower belly, it often takes its riſe from a ſingle puncture of a ſharp ſpur. The pain and ſmarting is one ſure ſign to diſtinguiſh the farcy from common accidents; the ſtaring of the hair, which ſtands up like a tuft all round the buds or bliſters, and the matter that iſſues from the buds, which is always purulent and of a clammy greaſy conſiſtence, are other certain ſigns. After bathing with the mixture above mentioned till the ulcers are ſmooth and healing, ſhould the ſwelling not ſubſide, to prevent the ſpreading of the buds, and to diſperſe them, bathe with either of theſe mixtures as far as the centre of the belly; and at the ſame time give a courſe of antimonials as will preſently be preſcribed.

TAKE ſpirits of wine four ounces, oil of vitriol and turpentine of each two ounces, white-wine vinegar or verjuice ſix ounces.

Or the following:

TAKE ſpirits of wine rectified four ounces, camphor half an ounce, vinegar or verjuice ſix ounces, white vitriol diſſolved in four ounces of ſpring-water one ounce. mix together.

In the lower limbs the farcy lies ſometimes concealed for a great while; and makes ſo ſlow a progreſs, that it is often miſtaken for greaſe, or for a blow or kick, and goes by the general appellation of *a humour ſettled there*. In order to diſtinguiſh the one from the other, we ſhall obſerve, that a kick or bruiſe is generally attended with a ſudden ſwelling, or a contuſed wound,

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wound, which for the moſt part digeſts eaſily: the greaſe is alſo a ſmooth ſwelling that breaks out above the bending of the paſterns backwards; but the farcy begins on the paſtern joint uſually with one bud, and runs upwards like a knotty crab-tree.

Very ſimple means have ſometimes ſtopped it, before it has begun to ſpread; a poultice with bran and verjuice bound round the part and renewed once a-day will often alone ſucceed; and if proud fleſh ſhould ariſe, touch it with oil of vitriol, or aquafortis, an hour before you apply the poultice; for when the diſtemper is local, as we ſuppoſe it here, it is to be conquered by outward applications.

The following balls are proper in every ſtate of the farcy; and when the diſtemper has been in its infancy, before the ſkin was much defaced, has often cured it in a week or two, by giving them only once or twice a-day: but in an old farcy they ſhould be given for two or three months together.

Take of native cinnabar, or cinnabar of antimony, eight ounces; long bithwort and gum guaiacum powdered, of each four ounces: make into a paſte with honey, and form into balls of the ſize of a large walnut, and roll them into liquorice-powder.

The tedioufneſs of this courſe has encouraged the giving of mercurials; and indeed, where they are directed with ſkill, they muſt be attended with ſucceſs: the ſtronger preparations, as the red and white precipitates, and turbith, being combined with ſharp ſaline parts, may be hazardous and injurious; but the latter given in ſmall quantities have been found very ſucceſsful in ſuch kind of inveterate diſorders. Mr Gibſon ſays, he has given it to a dram at a doſe, where the limbs have been greatly ſwelled; that in 48 hours the ſores were all dried up, and the limbs reduced; but that it made the horſe ſo violently ſick for ſeveral days, and ſcoured him to ſuch a degree, that it could not be repeated.

Mr Bartlet obſerves, that the ſucceſs attending this medicine ſo ſuddenly ought to have encouraged Gibſon to have made further trials in ſmaller quantities; which had he done, it is more than probable he would not have been diſappointed; for the grand ſecret in giving mercurials as alteratives, is the introducing them into the blood, without operating on the ſtomach and bowels; and to do this effectually, they muſt be given in ſmall quantities, and ſo bridled as to controul their force on the firſt paſſages; taken in this manner, they will mix gradually with the blood and juices, and operate both effectually and ſafely.

Dr Braken recommends the knots and cords to be rubbed with the mercurial ointment before they break, in order to diſperſe them; and after breaking, to dreſs the ſores with equal parts of Venice turpentine and quickſilver; if by theſe means the mouth ſhould become ſore, treat as above. This method ſeems to be effectual, with proper care.

The following is alſo recommended by the ſame gentleman:

Take butter of antimony and bezoar mineral, of each one ounce; beat up with half a pound of cordial ball; and give the bigneſs of a walnut, or three quarters of an ounce, every day for two or three weeks, faſting two or three hours after it.

The following mode of treatment and forms of medicine are preſcribed by Mr Taplin †.

Farcin or Farcy.

Upon the very earlieſt appearance of the diſorder, blood is to be taken away in ſufficient quantity. If the horſe is in high condition and full of fleſh, give him maſhes through the day of bleeding and the next day; and on the following morning a purging ball compoſed of ſocotorine aloes ten drams, calomel and jalap (in powder) each two drams and a half, rhubarb and ginger of each a dram and a half, with ſyrup of buckthorn or roſes ſufficient to form the ball. Let the purge be carefully attended to, and duly worked of. If the phyſic works favourably, and ſets well, let his feed (if his appetite is keen) for four clear days be plentiful, and on the fifth or ſixth at fartheſt repeat his purging ball. If the attack has been violent, or the diſorder makes rapid progreſs, a third doſe muſt be given in like manner. In two days after the courſe is completed, it is directed to begin upon the following antimonial alteratives, aſſiſted by a regular adminiſtration of nitre; both to be continued a month without the moſt trifling intermiſſion:

† P. 141.

Prepared antimony one pound, common ſulphur twelve ounces, cream of tartar eight ounces, and cinnabar of antimony ſix ounces:

Which being incorporated well in a mortar, is to be divided into twenty equal parts. Of theſe, one is to be given every night in the corn, firſt ſprinkling with water to enſure its adheſion, and two ounces of nitre are to be mixed with the water every morning, at which time he will generally drink it with the greater avidity as being moſt thirſty. The buds or ſwelling upon their firſt appearance may be well waſhed with the following twice every day, with a lotion compoſed of extract of Saturn two ounces, camphorated ſpirit of wine eight ounces, and diſtilled vinegar a pint; mixed well together, and kept cloſe ſtopt for uſe.

In a more advanced or inveterate ſtage of the diſtemper, moderate bleeding ſhould be repeated at proper intervals between the phyſic; and upon the ſcabs or eſchars peeling from the buds, waſh them well occaſionally with the following:

To two drams of corroſive mercury diſſolved in half a pint of Britiſh brandy, add a pint of white-wine vinegar, half a pint of ſpring water, and two ounces of tincture of myrrh; ſhaking well together.

Or, Sugar of lead and white vitriol each an ounce, diſtilled vinegar and ſpring water each one pint, ſtyptic tincture three ounces, well mixed together.

If the ulcers ſhould continue foul, and their edges become callous, very ſmall quantities of the ſtrong mercurial ointment muſt be gently rubbed into the centre of the moſt inveterate, once in three or four days, cleanſing them occaſionally with one of the waſhes before mentioned. In this caſe one of the following balls muſt be given regularly every morning for a month or longer if neceſſary. The proportion of nitre muſt be altered to three ounces, and given in the water every evening, the ball being adminiſtered in the morning.

Mercurial alterative Ball. Take Æthiop's mineral four ounces, milk of brimſtone, prepared antimony, cream of tartar, and cinnabar of antimony, each five ounces; honey ſufficient to make a maſs; which

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Farcin or Farcy.

which divide into a dozen equal balls, and roll up in liquorice or aniſeed powder.

It may not be improper now to add the ſymptoms of an incurable farcy, that the owners of ſuch horſes may ſave themſelves unneceſſary expenſe and trouble in their endeavours to obtain a cure. When a farcy, by improper applications, or by neglect, has ſpread and increaſed, or after long continuance reſiſted the medicines above recommended; if freſh buds are continually ſpouting forth, while the old ones remain foul and ill-conditioned; if they riſe on the ſpines of the back and loins; if the horſe grows hide-bound, and runs at the noſe; if abſceſſes are formed in the fleſhy parts between the interſtices of the large muſcles; if his eyes look dead and lifeleſs; if he forſakes his food, and ſcours often, and his excrements appear thin and of a blackiſh colour; if the plate or thigh vein continues large and corded after firing and other proper applications; theſe ſymptoms denote the diſtemper to have penetrated internally, and that it will degenerate into an incurable conſumption: it is moſt probable alſo that the whole maſs of fluids are tainted, and become irremediable by art.

Before cloſing this ſection, it is proper to take notice of what is called the *water farcy*; which has no reſemblance to a true farcy either in its cauſe, ſymptoms, or effects, but has only obtained this name thro' cuſtom and ignorance.—This water-farcy, then, is of two kinds: one the product of a feveriſh diſpoſition, terminating on the ſkin, as often happens in epidemical colds; the other is dropſical, where the water is not confined to the belly and limbs, but ſhows itſelf in ſeveral parts of the body by ſoft ſwellings yielding to the preſſure of the finger. This laſt kind uſually proceeds from foul feeding, or from the latter graſs and fog that often comes up in great plenty with continued cold rains, and breeds a ſluggiſh viſcid blood. In the former caſe, we have ſeen the limbs and whole body enormouſly ſwelled, and very hard, the belly and ſheath greatly diſtended; which were as ſurpriſingly reduced in 24 hours, by ſlight ſcarifications within-ſide the leg and thigh with a ſharp penknife, and three or four ſtrokes on the ſkin of the belly on each ſide the ſheath: from theſe ſcarifications there was a conſtant and ſurpriſing large dripping of water, which ſoon relieved the horſe; when a few purges completed his recovery.

In the other ſpecies of dropſy the curative intentions are to diſcharge the water, recover the craſis or ſtrength of the blood, and brace up the relaxed fibres throughout the whole body. To this end purge once a-week or ten days; and give intermediately either of the following.

Take black hellebore freſh gathered, two pounds; waſh, bruiſe, and boil in ſix quarts of water to four; and then ſtrain out the liquor, and put two quarts of white-wine on the remaining hellebore, and let it infuſe warm 48 hours: then ſtrain off, mix both together, and give the horſe a pint night and morning.

Take nitre two ounces, ſquills powdered three drams or half an ounce, camphor one dram, honey enough to form into a ball, to be given once a-day alone, or waſhed down with a horn or two of the above drink.

Sect. XXV. *Of Strains in Various Parts.*

Strains.

In all ſtrains, the muſcular or tendinous fibres are overſtretched; and ſometimes ruptured or broke. To form, therefore, a true idea of theſe diſorders, let us firſt conſider every muſcle and tendon as compoſed of ſpringy elaſtic fibres, which have a proper power of their own to contract and extend themſelves; or, to make their action more familiar, let us compare them to a piece of catgut, that we may the better judge with what propriety oily medicines are directed for their cure. Thus, then, if, by a violent extenſion of this catgut, you had ſo overſtretched it as to deſtroy its ſpringineſs or elaſticity, and was inclined to recover its loſt tone, would you for that purpoſe think of ſoaking it in oil? And is not the method of treating ſtrains, or overſtretched muſcles and tendons, full as prepoſterous, when you bathe or ſoak them in oily medicines, at a time that they want reſtringents to brace them up? Yet cuſtom has ſo eſtabliſhed this practice, and fallacious experience ſeemingly ſo confirmed it, that it would be a difficult taſk to convince the illiterate and prejudiced of the abſurdity, who, by attributing effects to wrong cauſes, are led into this error, and the oils uſurp the reputation that is due only to reſt and quiet: they ſeem, however, to be aware of the ill conſequences, by their adding the hot oils, as ſpike, turpentine, and origanum; which, though they in ſome meaſure guard againſt the too ſuppling quality of the other oils, yet the treatment is ſtill too relaxing to be of real ſervice.

And indeed, in all *violent* ſtrains of either tendons or muſcles, whatever opinion we may entertain of bathing and anointing with favourite noſtrums, which often ſucceed in ſlight caſes, where perhaps bandage alone would have done; yet it is the latter, with proper reſting the relaxed fibres till they have thoroughly recovered their tone, that are the chief things to be depended on; and frequently ſome months neceſſary for effecting the cure.

All violent ſtrains of the ligaments, which connect the bones together, eſpecially thoſe of the thigh, require time, and turning out to graſs, to a perfect recovery. External applications can avail but little here, the parts affected lying too deep, and ſo ſurrounded with muſcles that medicine cannot penetrate to them. The ſooner, in theſe caſes, a horſe is turned out to graſs, the better; as the gentle motion in the field will prevent the ligaments and joint-oil from thickening, and of courſe the joint itſelf from growing ſtiff.

When a horſe's ſhoulder is overſtrained, he does not put out that leg as the other; but, to prevent pain, ſets the ſound foot hardily on the ground to ſave the other; even though he be turned ſhort on the lame ſide, which motion tries him the moſt of any. When trotted in hand, inſtead of putting his leg forward in a right line, he forms a circle with the lame leg; and when he ſtands in the ſtable, that leg is advanced before the other.

In order to cure this lameneſs, firſt bleed him, and let the whole ſhoulder be well bathed three times a-day with hot verjuice or vinegar, in which may be diſſolved a piece of ſoap; but if the lameneſs continues without ſwelling or inflammation, after reſting two or three days, let the muſcles be well rubbed for a conſiderable

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Strains. derable time, to make them penetrate, with good opodeldoc, or either of the following mixtures.

Take camphorated ſpirit of wine two ounces, oil of turpentine one ounce; this proportion will prevent the hair coming off.

Or, Take the beſt vinegar half a pint, ſpirit of vitriol and camphorated ſpirit of wine of each two ounces.

When the ſhoulder is very much ſwelled, it ſhould be fomented with woollen cloths (large enough to cover the whole) wrung out of hot verjuice and ſpirit of wine; or a fomentation prepared with a ſtrong decoction of wormwood, bay-leaves, and roſemary, to a quart of which may be added half a pint of ſpirit of wine.

A rowel in the point of the ſhoulder in this caſe often does great ſervice; eſpecially if the ſtrain has been very violent, and the ſwelling very large: but as to boring up the ſhoulder with a hot iron, and afterwards inflating it, it is both a cruel and abſurd treatment: and the pegging up the ſound foot, or ſetting on a patten ſhoe, to bring the lame ſhoulder on a ſtretch, is a moſt prepoſterous practice, and directly calculated to render a horſe incurably lame; for it can only be neceſſary in caſes the very oppoſite to this, where the muſcles have been long contracted, and we want to ſtretch them out.

Where poultices can be applied, they are at firſt undoubtedly very effectual, after bathing with hot vinegar or verjuice; and are to be preferred greatly to cold charges, which, by drying ſo ſoon on the part, keep it ſtiff and uneaſy: let them be prepared with oatmeal, rye-flour, or bran boiled up in vinegar, ſtrong-beer or red-wine lees, with lard enough to prevent their growing ſtiff; and when by theſe means the inflammation and ſwelling is brought down, bathe the part twice a-day with either of the above mixtures, opodeldoc, or camphorated ſpirit of wine; and roll the part three or four inches, both above and below, with a ſtrong linen roller of about two fingers width; which contributes not a little to the recovery, by bracing up the relaxed tendon; and perhaps is more to be depended on than the applications themſelves.

In ſtrains of the *coffin joint*, that have not been diſcovered in time, there will grow ſuch a ſtiffneſs in the joint, that the horſe will only touch the ground with his toe; and the joint cannot be played with the hand: the only method here is repeated bliſtering, and then firing ſuperficially.

Strains of the *back ſinews* are very common; and are eaſily diſcovered by the ſwelling, which extends ſometimes from the back-ſide of the knee down to the heel, but for the moſt part the horſe ſets that foot before the other. The tendon ſhould be well bathed three or four times a-day with hot vinegar; and if much ſwelled, apply the poultices above recommended; and when the ſwelling is down, bathe with the mixtures above, or with camphorated ſpirit of wine and oil of amber, in which is diſſolved as much camphor as the ſpirits will take up; and roll up the tendon with a proper bandage or laced ſtocking; which laſt, properly fitted to the limb, might be wore to great advantage, not only in theſe ſort of injuries, but in moſt others, where there is a diſpoſition to the greaſe, or other ſwellings of the limbs, from weak and relaxed fibres. Curriers ſhavings wetted with vinegar have been found uſeful for this purpoſe; as has alſo tar and ſpirit of wine: but where the tendons have ſuffered by repeated injuries of this kind, the caſe will demand bliſtering, firing, and proper reſt. Strains.

Strains of the *knees* and *paſterns* ariſe frequently from kicks or blows: if they are much ſwelled, apply firſt the poultices; and when the ſwelling is abated, bathe with the above, or the following.

Take vinegar one pint, camphorated ſpirit of wine four ounces, white vitriol diſſolved in a little water two drams.

Or, Take the white of three or four eggs, beat them into a froth with a ſpoon; to which add an ounce of rock alum finely powdered, ſpirit of turpentine and wine of each half an ounce; mix them well together.

As great weakneſs remains in the paſterns after violent ſtrains, the beſt method is to turn the horſe out to graſs till he is perfectly recovered; when this cannot be complied with, the general way is to bliſter and fire.

When a horſe is lame in the *ſtifle*, he generally treads on his toe, and cannot ſet the heel to the ground. Treat him at firſt with the vinegar and cooling reſtringents: but if a large ſwelling, with puffineſs, enſues, foment it well with the diſcutient fomentation till it diſperſes; and then bathe the part with any of the above medicines.

A lameneſs in the *whirl-bone* and hip, is diſcovered by the horſe's dragging his leg after him, and dropping backward on his heel when he trots. If the muſcles of the hip are only injured, this kind of lameneſs is cured eaſily; but when the ligaments of the joint are affected, the cure is often very difficult, tedious, and uncertain. In either caſe, at firſt bathe the parts well with the cooling medicines, four or five times a-day: in the muſcular ſtrain, this method alone may ſucceed; but in the ligamentous, it is reſt and time only can reſtore the injured parts to their proper tone.

Strains in the *hock* are to be treated by ſoaking the parts with coolers and repellers; but when the ligaments are hurt, and they are attended with great weakneſs and pain, uſe the fomentation. If a hardneſs ſhould remain on the outſide, it may be removed by repeated bliſtering; if within, it may be out of the power of any external applications to remove: however, the joint ſhould be fired gently with ſmall razes or lines pretty cloſe together, and then covered with a mercurial plaſter. To the diſcutient fomentation above mentioned may be added crude ſal ammoniac, with a handful of wood-aſhes boiled in it.

The bliſtering ointment for the above purpoſes may be found in the Section of *Bone-ſpavin*; but the ſublimate ſhould be omitted.

The *firing*, ſo generally uſed for the ſtrengthening relaxed ſinews or tendons, is made to act upon different parts according to the different notions of the operator. Moſt uſually it is intended to act only on the ſkin, which, by contracting and hardening it all round the ſinews, compreſſes them more firmly like a bandage. The bowmen of old, it is alleged, ſubmitted to this operation, in order to give ſtrength to the muſcles and tendons of their arms. Upon this principle, a proper degree of ſkill is very requiſite to perform it

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Tumors and Impoſthumes.

effectually on a horſe; for a due medium ſhould be obſerved, and the inſtrument neither ſo ſlightly applied as to ſcarify the ſkin only ſuperficially, nor ſo deep as to wound or cauteriſe the ſinew or its ſheath. The lines ſhould be drawn pretty cloſe together, on each ſide of the joint or ſinew, following the courſe of the hair; no croſs lines ſhould be made, as they but diſfigure the horſe afterwards, without any real uſe. The firing inſtrument, or knife, ought to be a little rounded on the edge, gradually thickening to the back, that it may retain the heat for ſome time, but ſhould not be applied till the flaming redneſs is partly gone off. The cauterized parts may be bathed with ſpirit of wine at firſt; and anointed afterwards with bees-wax and oil, which alone is ſufficient to complete the cure. But, in every view, this operation deſerves to be condemned, upon the following judicious obſervations of Oſmer. "Between the tendon and the ſkin of the leg, as nothing intervenes but a thin membrane, what hand can determine betwixt the boundaries of thoſe bodies, whoſe appearance, by the heat of the iron, is made undiſtinguiſhable to the eye? Now mark the event of firing. If the fire reaches no further than the ſkin, little advantage can accrue to the tendon, but the fibres of the ſkin will become contracted and leſs pliant; if the fire reaches the membrane or ſheath of the tendon, ſome of its glands are deſtroyed, and the tendon becomes more or leſs rigid. If the tendon be burnt, the conſequence will be ſtill worſe; and in either caſe the velocity of motion will be impeded: on all theſe occaſions the horſe ſhould be turned to graſs and indulged with proper reſt, that the diſeaſed parts may recover their former firmneſs, tone, and ſtrength."

Sect. XXVI. *Of Tumors and Impoſthumes.*

Tumors, or ſwellings, ariſe either from external injuries or internal cauſes.

1. Swellings cauſed by external accidents, as blows and bruiſes, ſhould at firſt be treated with reſtringents: Thus, let the part be bathed frequently with hot vinegar or verjuice; and, where it will admit of bandage, let a flannel wetted with the ſame be rolled on: if by this method the ſwelling does not ſubſide, apply, eſpecially on the legs, a poultice with red wine lees, ſtrong-beer grounds, and oatmeal, or with vinegar, oil, and oatmeal: either of theſe may be continued twice a-day, after bathing, till the ſwelling abates; when, in order to diſperſe it entirely, the vinegar ſhould be changed for camphorated ſpirit of wine, to four ounces of which may be added one of ſpirit of ſal ammoniac; or it may be bathed with a mixture of two ounces of crude ſal ammoniac boiled in a quart of chamber-lye twice a-day, and rags dipped in the ſame may be rolled on.

Fomentation made by boiling wormwood, bay-leaves, and roſemary, and adding a proper quantity of ſpirits, are often of great ſervice to thin the juices, and fit them for tranſpiration; eſpecially if the injury has affected the joints.

But in bruiſes, where the extravaſated blood will not by theſe means be diſperſed, the ſhorteſt way is to open the ſkin, and let out the grumes.

Critical tumors or ſwellings, which terminate fevers, ſhould by no means be diſperſed; except when they fall on the paſtern or coffin joint, ſo as to endanger them: in this caſe the diſcutient fomentation, (p. 143. col. 1.) ſhould be applied three or four times a-day, and a cloth or flannel frequently wrung out of the ſame ſhould be bound on, in order to keep the joint continually breathing.

Tumors and Impoſthumes.

But all tumors tending to certain maturation (from whatever cauſe they originated), ſhould be expeditiouſly aſſiſted by fomentation as already directed; and, after each time of uſing the fomentation, the ripening encouraged by ſuppurating poultices wherever they can be applied: oatmeal boiled ſoft in milk, to which a proper quantity of oil and lard is added, may anſwer this purpoſe; or the poultice recommended in the Section of *Strangles*. Theſe applications muſt be regularly continued till the matter is perceived to fluctuate under the fingers, when it ought to be let out: for which purpoſe, let the tumor be opened with a knife or ſtrong lancet, the whole length of the ſwelling, if it can be done ſafely; for nothing contributes ſo much to a kind healing as the matter's having a free diſcharge, and the opening's being big enough to dreſs to the bottom.

Pledgets of tow or lint ſpread with black or yellow baſilicon (or the wound ointment), and dipped in the ſame, melted down with a fifth part of oil of turpentine, ſhould be applied to the bottom of the ſore, and filled up lightly with the ſame, without cramming: it may be thus dreſſed once or twice a-day, if the diſcharge is great, till a proper digeſtion is procured; when it ſhould be changed for pledgets ſpread with the red precipitate ointment, applied in the ſame manner.

Should the ſore not digeſt kindly, but run a thin water and look pale, foment, as often as you dreſs, with the above fomentation; and apply over your dreſſing the ſtrong-beer poultice, and continue this method till the matter grows thick, and the ſore florid.

The following ointments will generally anſwer your expectations in all common caſes; and may be prepared without, as well as with, the verdigreaſe.

Take Venice turpentine and bees-wax of each a pound, oil of olives one pound and a half, yellow roſin 12 ounces; when melted together, two or three ounces of verdigreaſe, finely powdered, may be ſtirred in, and kept ſo till cold, to prevent its ſubſiding.

Take of yellow baſilicon, or the above ointment, without verdigreaſe, four ounces; red precipitate, finely powdered, half an ounce: mix them together cold with a knife or ſpatula.

This laſt, applied early, will prevent a fungus, or proud fleſh, from ſhooting out: for if you dreſs too long with the above digeſtive, the fungus will riſe faſt, and give ſome trouble to ſuppreſs it; when it will be neceſſary to waſh the ſore, as often as your dreſs, with a ſolution of blue vitriol in water, or to ſprinkle it with burnt alum and precipitate. If theſe ſhould not be powerful enough, touch with a cauſtic, or waſh with the ſublimate water made by diſſolving half an ounce of corroſive ſublimate in a pint of lime-water.

But this trouble may in a great meaſure be prevented, if the ſore is on a part where bandages can be applied with compreſſes of linen-cloth: for even when theſe excreſcences regerminate, as it were, under the knife, and ſpring up in ſpite of the cauſtics above

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mentioned, they are to be ſubdued by moderate compreſſion made on the ſprouting fibres by theſe means.

As ſoon as the wound is ſkinned over, throwing aſide all greaſy applications, let the ſurface be hardened firſt with equal parts of tincture of myrrh and vinegar, afterwards with tincture of myrrh alone. If any eſchar of conſequence ſhould remain, and the hair not follow kindly, rub the part gently every night with a ſmall quantity of camphorated ſpermaceti ointment, the beſt article known to promote the return of the hair upon the knees or any other part.

Authors on farriery have given in general very proper receipts to anſwer every intention of this kind by medicines: but as they have not laid down ſufficient rules for their application in thoſe caſes where they are moſt wanted, the following general directions will not be unacceptable; as the difficulty in healing ſome kinds of ſores ariſes frequently from the unſkilful manner of dreſſing them.

It may be neceſſary then to obſerve here, once for all, that the cures of moſt ſores are effected by the ſimpleſt methods; and that it is often of much more conſequence to know how to dreſs a ſore, than what to dreſs it with. And in this conſiſts indeed the chief art of this branch of ſurgery: for the moſt eminent in that profeſſion have long ſince diſcovered, that variety of ointments and ſalves are unneceſſary in the cure of moſt wounds and ſores; and they have accordingly diſcarded the greateſt part formerly in repute for that purpoſe; repeated obſervations having taught them, that, after the digeſtion, nature is generally diſpoſed to heal up the wound faſt enough herſelf; and that the ſurgeon's chief care is to prevent a luxuriancy, commonly called *proud fleſh*; which all ointments, wherein lard or oil enters, are but too prone to encourage, as they keep the fibres too lax and ſupple; and which dry lint alone, early applied, as eaſily prevents, by its abſorbing quality, and light compreſſion on the ſprouting fibres.

Thus, if a hollow wound or ſore is crammed with tents, or the dreſſings are applied too hard, the tender ſhoots of fleſh from the bottom are prevented puſhing up; and the ſides of the ſore from this diſtenſion may in time grow horny and turn fiſtulous; nor has the matter by this method a free diſcharge.

On the other hand, if ſores of any depth are dreſſed ſuperficially, the external parts being more diſpoſed to heal and come together than the internal, they will fall into contact, or heal too ſoon; and the ſore, not filling up properly from the bottom, will break out afreſh.

Hence we may juſtly conceive how little ſtreſs is to be laid on famous ointments, or family ſalves, unſkilfully applied; for unleſs this due medium is obſerved, or obtained in the dreſſing, no hollow ſore can heal up properly.

As ſoon then as a good digeſtion is procured (which is known by the thickneſs and whiteneſs of the matter diſcharged, and the florid red colour at the bottom of the ſore), let the dreſſings be changed for the precipitate medicine; or the ſore may be filled up with dry lint alone, or dipped in lime-water, with a little honey and tincture of myrrh, or brandy, about a fifth part of the latter to one of the former: a pledget of lint, dipped in this mixture, ſhould alſo be applied to the bottom of the ſore, which ſhould be filled up with

Wounds in General.

others to the ſurface or edges, but not crammed in too hard, as before obſerved, nor yet applied too looſely.

By this method, the ſore would incarnate, or heal up properly, and ſoft ſpongy fleſh would be prevented or ſuppreſſed in time; whereas when ointments or ſalves are too long continued, a fungus, or proud fleſh, is thereby ſo encouraged in its growth, that it requires ſome time to deſtroy and eat it down again: a proper compreſs of cloth, and a linen roller, is abſolutely neceſſary both for this purpoſe and to ſecure on the dreſſings, wherever they can conveniently be applied.

2. Scrofulous tumors are ſuch as originate in ſcorbutic or hereditary taints, and increaſe or diminiſh according to the ſtate or acrimony of the blood. For theſe the principal application is the ſtrongeſt mercurial unguent, thus prepared.

Quicksilver two ounces, lard ſix ounces, balſam of ſulphur half an ounce. The quickſilver to be rubbed with the balſam in a metal mortar till the globules diſappear; then the lard (firſt made warm) to be added by degrees.

The uſe of this unguent muſt be aſſiſted by a courſe of mercurial and antimonial alteratives.

3. The other tumors that may be here noticed are the œdematous, ſteatomatous, and encyſted. The œdematous and encyſted tumors are nearly ſynonymous, originating in a cyſt or bag, containing a kind of ichorous bloody ſanies or gelatinous fluid; which being evacuated, the cyſt does not always ſubmit to digeſtives or eſcharotics, but muſt be extirpated with the knife, and cured as a common wound.

The ſteatomatous are thoſe tumors that form on different parts, and paſs in general under the denomination of *wens*, containing, when opened or extracted, a ſubſtance not unlike ſuet when hardly cold.

Neither of the above are expected to ſubmit to any topical application, unleſs upon the very firſt obſervation; when an attempt may be made by the moſt powerful repellents, and a ſmall portion of the above mercurial ointment rubbed in every night, for a conſiderable length of time; but no radical cure can be in general obtained but by inſtrumental extirpation; and as this muſt be unavoidably attended with loſs of time, and a proportional ſhare of danger, if ſeated upon or interſected by the muſcular parts, perhaps it may be moſt prudent to omit the experiment and ſubmit it to chance.

Sect. XXVII. *Of Wounds in General.*

In all freſh wounds made by cutting inſtruments, there is nothing more required than bringing the lips of the wound into contact by ſuture or bandage, provided the part will allow of it; for on wounds of the hips, or other prominent parts, and acroſs ſome of the large muſcles, the ſtitches are apt to burſt on the horſe's lying down and riſing up in the ſtall. In ſuch caſes, the lips ſhould not be brought cloſe together: one ſtitch is ſufficient for a wound two inches long: but in large wounds, they ſhould be at an inch or more diſtance; and if the wound is deep in the muſcles, care ſhould be taken to paſs the needles proportionably deep, otherwiſe the wound will not unite properly from the bottom.

Should the wound bleed much from an artery divided, the firſt ſtep ſhould be to ſecure it, by paſſing a crooked needle underneath, and tying it up with a waxed

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Wounds in General.

waxed thread: if the artery cannot be got at this way, apply a button of lint or tow to the mouth of the bleeding veſſels, dipped in a ſtrong ſolution of blue vitriol, ſtyptic water, oil of vitriol, or hot oil of turpentine, powdered vitriol, or colcothar, &c. and remember always to apply it cloſe to the mouth of the bleeding veſſels, and take care that it is kept there by proper compreſs and bandage till an eſchar is formed; otherwiſe it will elude your expectations, and frequently alarm you with freſh bleedings.

In a memoir preſented to the Royal Academy of Sciences by M. La Foſſe, he gives an account of the ſucceſs he had met with in ſtopping the bleedings of very conſiderable arteries in horſes, by the application of the powder of puff-balls, the arteries cicatriſing by this means only, without any ſucceeding hæmorrhage. The lycoperdon, or puff-ball, was made uſe of for this purpoſe in human ſubjects, about 170 years ago, by Felix Wurtz, a famous old ſurgeon in Germany; but he does not ſeem to have thought of truſting to it in ſuch conſiderable arteries as M. La Foſſe mentions, *viz.* thoſe of the leg and thigh, the bleedings from which divided veſſels he ſtopt in a few minutes by the uſe of this powder only. The agaric of the oak may alſo be uſed for this purpoſe, where it can be retained by a proper bandage.

Theſe applications, as indeed all ſtyptics, ſeem to act by conſtringing the extremity of the veſſel, or choaking it up, till a grume of blood is formed internally, which plugs up the orifice; and has been found to adhere to it ſo as to conſtitute one body with the veſſel.

We avoid ſetting down any famous receipts for freſh wounds, whether ointments, or Friar's balſams, being well aſſured, that, in a healthy ſound conſtitution, nature furniſhes the beſt balſam, and performs herſelf the cure, which is ſo often attributed to the medicine; when it is otherwiſe, and the blood is deprived of its balſamic ſtate, as will appear from the aſpect of the wound and its manner of healing, it muſt be rectified by proper internal medicines, before a good foundation for healing can be laid by any external application whatever.

The lips of the wound then being brought together by the needle or bandage, it needs only to be covered with rags dipped in brandy, or a pledget of tow ſpread with the wound ointment, (ſee page 144. col. 2.) the directions in the preceding ſections being obſerved, and the wounded part kept as much as poſſible from motion.

Punctured wounds from thorns, or any other accidents, ſhould be treated in the ſame manner; applying the beer or bread and milk poultice over the dreſſing, till ſome ſigns of digeſtion appear; and fomenting the part well every day. This method is alſo very ſucceſsfully uſed to thoſe ſwellings which often ariſe on the neck from bleeding; the ſores being ſprinkled with precipitate, and burnt alum powdered, to fetch out the core or fungous, which choaks up the orifice. The uſual method is to introduce a piece of vitriol, or ſublimate, which often brings on a plentiful diſcharge, fetches out the core, and makes a cure; but it is often with the loſs of the vein, and it ſometimes leaves a large ſwelling and impoſthumation.

In gun-ſhot wounds, when the ball has not penetrated too deep, it ſhould be extracted, if it can be fetched away without diſturbance, together with any extraneous bodies that might paſs in with it; the wound ſhould be dreſſed with the old digeſtive of Venice or common turpentine, divided with the yolks of eggs, to which may be added ſome honey and tincture of myrrh. The entrance of theſe wounds frequently requires to be enlarged, and a depending orifice ſhould always be procured if poſſible; and if the wound ſhould not digeſt kindly, apply the beer poultice, and foment with the diſcutient fomentation before mentioned. Wounds in General.

In ſcalds, or burns from gunpowder, or any other cauſe, when the ſkin remains entire, bathe the part well, and keep it ſoaked with rags dipped in ſpirit of wine camphorated: ſalt bound thick on the part has been found very effectual for this purpoſe; and indeed all ſaline and ſpirituous applications excel others, while the ſkin is yet unbroke; but when the ſkin is ſeparated, anoint the part, and keep it conſtantly ſupple with linſeed or ſalad oil, and a plaſter ſpread with bees-wax and oil; if the ſkin is ſo ſcorched, that ſloughs muſt be digeſted out, dreſs with the wound-ointment and oil of turpentine; and finiſh the cure with any drying ointment. Should the horſe be feveriſh from the pain, bleed him, give cooling glyſters, and treat him as we have directed in ſimple fevers.

There are certain wounds which occur much more frequently than any other, and which from that circumſtance, though in themſelves not at all dangerous, deſerve particular notice. Among theſe are broken knees, over-reaches, and lacerations between hair and hoof. In reſpect to the firſt, it is a misfortune whenever it happens that not only reduces the horſe very much in his value, but is conſidered as an indelible ſtigma of imperfection, that (with connoiſſeurs) renders him at firſt ſight unworthy a ſecond conſideration. This misfortune may ſometimes be occaſioned by unavoidable accident; but Mr Taplin is juſtly of opinion that more horſes are thrown down and irremediably injured by the careleſſneſs and ſhameful inattention of bad riders on bad roads and over rolling ſtones, or when they are more cruelly exhauſted with labour and fatigue, than by any other means in the whole liſt of accidents.

In relieving this injury, the firſt ſtep is to waſh the parts well with a ſponge and warm water, thoroughly cleanſing the lacerations from gravel or ſand; for theſe will evidently irritate and inflame the tender parts, and be productive of a diſcharge which may often be entirely prevented by gently wiping them dry after the uſe of the ſponge, and plentifully embrocating them with a mixture of camphorated ſpirits and vinegar in equal quantities, bandaging over a pledget of tow wet with the ſame, and repeating it once or twice if circumſtances ſhould render it neceſſary. This ſhould be continued, that an eſchar or cicatrix may be formed to render unctuous or greaſy applications unneceſſary; but ſhould the wound or laceration be ſo violent as to produce great inflammation, ſuppuration muſt enſue, and ought to be encouraged by the means already directed, and the ſore healed in the manner alſo above directed.

As to over-reaches and other injuries in the feet, they are treated of in their order under *Diſeaſes of the Feet*.

Sect.

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Ulcers in General.

SECT. XXVIII. *Of Ulcers in General.*

WE ſhall not here enter into a deſcription of each particular ſpecies of ulcers, but only lay down ſome directions for their general treatment; by which means we ſhall avoid the uſual prolixity of authors on this ſubject, and yet give ſo general an idea of the nature of ulcers, as we hope will be ſufficiently inſtructive both of the application and of the proper remedy to each.

It may be neceſſary to obſerve, that we may often in vain purſue the beſt methods of cure by external applications, unleſs we have recourſe to proper internal remedies; for as all ulcers, difficult to heal, proceed from a particular indiſpoſition of the blood and juices, before the former can be brought into any order, the latter muſt be corrected by alteratives and ſweetening medicines.

The firſt intention in the cure of ulcers is bringing them to digeſt, or diſcharge a thick matter; which will, in general, be effected by the green ointment, or that with precipitate; but ſhould the ſore not digeſt kindly by theſe means, but diſcharge a gleety thin matter, and look pale, you muſt then have recourſe to warmer dreſſings, ſuch as balſam, or oil of turpentine, melted down with your common digeſtive, and the ſtrong-beer poultice over them; it is proper alſo in theſe kind of ſores, where the circulation is languid, and the natural heat abated, to warm the part, and quicken the motion of the blood, by fomenting it well at the time of dreſſing; which method will thicken the matter, and rouſe the native heat of the part, and then the former dreſſings may be re-applied.

If the lips of the ulcer grow hard or callous, it will be neceſſary to foment ſtrongly with a decoction of camomile and mallows, as hot as can be conveniently applied; then ſcarify ſuperficially the whole part, both longitudinally and tranſverſely, with a fleam or abſceſs lancet, ſo as to entirely penetrate the callous ſubſtance upon the ſurface: after which it muſt be dreſſed with digeſtive ointment twice every day; the fomentation and ſcarifications to be repeated occaſionally, if neceſſary, till the callofity is quite ſloughed off, and comes away with the dreſſings. A proper ointment for the above purpoſe may be prepared as follows.

TAKE of yellow baſilicon two ounces, and black baſilicon one ounce, and melt them together over the fire. When taken off, ſtir in one ounce of turpentine; and when cool, add half an ounce of red precipitate finely powdered, the whole to be minutely incorporated upon a ſtone or marble ſlab.

As ſoon as the callofity is removed, and the diſcharge comes to its proper conſiſtence, dreſs in general with a ſmall portion of lint, thinly covered with either of the baſilicons, placed under a pledget of tow ſpread with the following digeſtive:

YELLOW wax and black roſin each four ounces, Burgundy pich two ounces: melt theſe in a pint of oil olive over a ſlow fire; and when taken off, ſtir in two ounces of turpentine. For large wounds, where a plentiful diſcharge is required, ſtir into this quantity three ounces of the ſpirits of turpentine, that it may incorporate in getting cool.

Should the wound incarnate too faſt, and fill with fungous fleſh, ſlightly touch ſuch parts with a piece of unſlacked lime, regulating the mode and application by the neceſſity, and repeating it as occaſion may require. When the cicatrix is nearly formed, the cure may be completed by hardening the ſurface with a little tincture of myrrh.

Ulcers in General.

All ſinuſes, or cavities, if no tendinous parts intervene, ſhould be inſtantly laid open (with a biſtory) to its utmoſt extent, and properly filled with a pledget of lint, well impregnated with warm digeſtive, and plentifully covered with tow ſpread with the ſame. After a ſecond or third dreſſing, ſhould the inſide of ſuch cavity prove callous, or hard in ſubſtance, it muſt be taken away by the knife, or deſtroyed by the means before deſcribed. If it be ſo ſituated that the parts forbid an entire ſeparation, ſound with the probe, and at its extremity make a counter inciſion through the integuments to meet the probe, till, by paſſing through, it removes any lodgment that may have been left for the matter to corrode, which it will very ſoon do, ſo as in many caſes to affect the bone itſelf.

Where the cavity penetrates deep into the muſcles, and a counter opening is impracticable or hazardous; where, by a continuance, the integuments of the muſcles are conſtantly dripping and melting down; in theſe caſes waſhes may be injected, and will frequently be attended with ſucceſs. The following is particularly recommended by Mr Taplin.

TAKE honey and vinegar each two ounces; liquefy over the fire; and when cool add tincture of myrrh and tincture of cantharides each one ounce. —Mix.

When the ulcer is by theſe means diveſted of its virulence and bad ſmell, the callofity ſloughed off or extracted, and a favourable appearance of incarnation comes on, the dreſſings may be changed from the precipitate digeſtive before preſcribed, to pledgets ſpread with Locatellus's balſam, or the following compound.

TAKE white diachylon two ounces, Locatellus's balſam one ounce, and melt them over the fire in two ounces of olive oil. Take off; and when nearly cool, ſtir in an ounce of balſam of capivi, a little at a time, till it is all incorporated.

Theſe ſinuſes, or cavities, frequently degenerate into *fiſtule*, that is, grow pipey, having the inſide thickened, and lined, as it were, with a horny callous ſubſtance. In order to their cure, they muſt be laid open, and the hard ſubſtance all cut away; where this is impracticable, ſcarify them well, and truſt to the precipitate medicine made ſtrong, rubbing now and then with cauſtic, butter of antimony, or equal parts of quickſilver and aquafortis.

When a rotten or foul bone is an attendant on an ulcer, the fleſh is generally looſe and flabby; the diſcharge oily, thin, and ſtinking; and the bone diſcovered to be carious, by its feeling rough to the probe paſſed through the fleſh for that purpoſe. In order to a cure, the bone muſt be laid bare, that the rotten part of it be removed: for which purpoſe, deſtroy the looſe fleſh, and dreſs with dry lint; or the doſſils may be preſſed out of tincture of myrrh or euphorbium. The throwing off the ſcale is generally a work of nature, which is effected in more or leſs time, and in proportion to the depth the bone is affected; though burning the foul bone is thought by ſome to haſten its ſeparation.

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Bone-Spavin.

Where the cure does not properly succeed, mercurial physic should be given, and repeated at proper intervals: and to correct and mend the blood and juices, the antimonial and alterative powders, with a decoction of guaiacum and lime-water, are proper for that purpose.

Sect. XXIX. *Of a Bone-Spavin.*

Without entering at all into the cause of this disorder, which is a bony excrescence, or hard swelling, growing on the inside of the hock of a horse's leg, we shall content ourselves with describing the different kinds thereof by their symptoms, and then enter on their cure.

A spavin, that begins on the lower part of the hock, is not so dangerous as that which puts out higher, between the two round processes of the leg-bone; and a spavin near the edge is not so bad as that which is more inward toward the middle, as it does not so much affect the bending of the hock.

A spavin, that comes by a kick or blow, is at first no true spavin, but a bruise on the bone, or membrane which covers it; therefore not of that consequence as when it proceeds from a natural cause: and those that put out on colts and young horses, are not so bad as those that happen to horses in their full strength and maturity; but in very old horses they are generally incurable.

The usual method of treating this disorder is by blisters and firing; without any regard to the situation, or cause whence it proceeds. Thus, if a fulness on the fore-part of the hock comes upon hard riding, or any other violence, which threatens a spavin; in that case, such coolers and repellers are proper, as are recommended in strains and bruises. Those happening to colts and young horses are generally superficial, and require only the milder applications; for it is better to wear them down by degrees, than to remove them at once by severe means.

Various are the prescriptions for the blistering ointment; but the following, on proper experience, stands well recommended by Mr Gibson.

Take nerve and marsh-mallow ointment, of each two ounces; quicksilver, one ounce, thoroughly broke with an ounce of Venice turpentine; Spanish flies powdered, a dram and a half; sublimate, one dram; oil of origanum, two drams.

The hair is to be cut as close as possible, and then the ointment applied pretty thick over the part; this should be done in the morning, and the horse kept tied up all day without any litter till night; when he may be untied, in order to lie down; and a pitch or any sticking plaster may be laid over it, and bound on with a broad tape or bandage to keep all close.

After the blister has done running, and the scabs begin to dry and peel off, it may be applied a second time, in the same manner as before; this second application generally taking greater effect than the first, and in colts and young horses makes a perfect cure.

When the spavin has been of long standing, it will require to be renewed, perhaps five or six times: but after the second application, a greater distance of time must be allowed, otherwise it might leave a scar, or cause a baldness; to prevent which, once a-fortnight or three weeks is often enough; and it may in this manner be continued six or seven times, without the least blemish, and will generally be attended with success.

Curb and Ring-bone.

But the spavins that put out on older or full-aged horses are apt to be more obstinate, as being seated more inward; and when they run among the sinuosities of the joint, they are for the most part incurable, as they then lie out of the reach of applications, and are arrived to a degree of impenetrable hardness.

The usual method in these cases is to fire directly, or to use the strongest kind of caustic blisters; and sometimes to fire and lay the blister immediately over the part: but this way seldom succeeds farther than putting a stop to the growth of the spavin, and is apt to leave both a blemish and stiffness behind; besides the great risk run (by applications of these fiery and caustic medicines to the nervous and tendinous parts about the joints) of exciting violent pain and anguish, and destroying the limb.

The best and safest way, therefore, is to make trial of the blistering ointment above, and to continue it according to the directions there laid down, for some months, if found necessary; the horses in the intervals working moderately: the hardness will thus be dissolved by degrees, and wear away insensibly.

Where the spavin lies deep, and runs so far into the hollow of the joint that no application can reach it, neither firing nor medicines can avail, for the reasons above mentioned; though bold ignorant fellows have sometimes succeeded in cases of this sort (by men of judgment deemed incurable) by the application of caustic ointments with sublimate, which act very forcibly, enter deep, and make a large discharge, and by that means destroy a great part of the substance, and dissolve away the remainder: though, whoever is at all acquainted with the nature of these medicines, must know how dangerous in general their operation is on these occasions; and that a proper prepared cautery made like a fleam, under the direction of a skilful hand, may be applied with less danger of injuring either tendons or ligaments. After the substance of the swelling has been properly penetrated by the instrument, it must be kept running by the precipitate medicine, or mild blistering ointment. Where the spavin lies not deep in the joint, and the blistering method will not succeed, the swelling may be safely fired with a thin iron forced pretty deep into the substance, and then should be dressed as is above directed.

Sect. XXX. *Of a Curb and Ring-bone.*

1. As a spavin rises among the bones on the fore-part of the hock, so a curb takes its origin from the junctures of the same bones, and rises on the hind-part, forming a pretty large tumor over the back part of the hind-leg, attended with stiffness, and sometimes with pain and lameness.

A curb proceeds from the same causes that produce spavins; viz. hard riding, strains, blows, or kicks. The cure at first is generally easy enough effected by blistering, repeated two or three times, or oftener. If it does not submit to this treatment, but grows excessively hard, the quickest and surest way is to fire with a thin iron, making a line down the middle from top to bottom, and drawing several lines in a penniform manner pretty deep; and then to apply a mild blister-

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Splents

ing plaſter or ointment over it.—This method will entirely remove it.

There is another ſwelling taken notice of on the outſide of the hock, which is called a *jarden*. This commonly proceeds from blows and kicks of other horſes; but frequently happens to maneged horſes, by ſetting them on their haunches: it is ſeldom attended with much lameneſs, unleſs it has been neglected, or ſome little proceſs of the bone be broke. It ſhould firſt be treated with the coolers and repellers in ſect. xxxii. art. 2.: but if any ſwelling continues hard and inſenſible, the beſt way is to bliſter or fire; but the mild bliſters alone generally ſucceed.

2. The *ring-bone* is a hard ſwelling on the lower part of the paſtern, which generally reaches half way round the fore-part thereof, and from its reſemblance to a ring has its denomination. It often ariſes from ſtrains, &c.; and, when behind, from putting young horſes too early upon their haunches; for in that attitude a horſe throws his whole weight as much, if not more, upon his paſterns, than on his hocks.

When it appears diſtinctly round the paſtern, and does not run downwards toward the coronet, ſo as to affect the coffin-joint, it is eaſily cured: but if it takes its origin from ſome ſtrain or defect in the joint originally, or if a calloſity is found under the round ligament that covers that joint, the cure is generally dubious, and ſometimes impracticable; as it is apt to turn to a quittor, and in the end to form an ulcer upon the hoof.

The ring-bones that appear on colts and young horſes, will often inſenſibly wear off of themſelves, without the help of any application; but when the ſubſtance remains, there needs no other remedy beſides bliſtering, unleſs when by long continuance it is grown to an obſtinate hardneſs, and then it may require both bliſtering and firing.

To fire a ring-bone ſucceſsfully, let the operation be performed with a thinner inſtrument than the common one, and let the lines or razes be made not above a quarter of an inch diſtant, croſſing them obliquely, ſomewhat like a chain: apply a mild bliſter over all, and, when quite dried up, the rupture-plaſter; and then turn the horſe to graſs for ſome time.

Sect. XXXI. *Of Splents.*

These are hard excreſcences that grow on the ſhank-bone, and are of various ſhapes and ſizes. Some horſes are more ſubject to ſplents than others; but young horſes are moſt liable to theſe infirmities, which often wear off and diſappear of themſelves. Few horſes put out ſplents after they are ſeven or eight years old, unleſs they meet with blows or accidents.

A ſplent that ariſes in the middle of the ſhank-bone is nowiſe dangerous; but thoſe that ariſe on the back part of this bone, when they grow large and preſs againſt the back ſinew, always cauſe lameneſs or ſtiffneſs, by rubbing againſt it: the others, except they are ſituated near the joints, ſeldom occaſion lameneſs.

As to the cure of ſplents, the beſt way is not to meddle with them, unleſs they are ſo large as to diſfigure a horſe, or are ſo ſituated as to endanger his going lame.

Splents in their infancy, and on their firſt appearance, ſhould be well bathed with vinegar, or old verjuice; which, by ſtrengthening the fibres, often put a ſtop to their growth: for the membrane covering the bone, and not the bone itſelf, is here thickened; and in ſome conſtitutions purging, and afterwards diuretic drinks, will be a great means to remove the humidity and moiſture about the limbs, which is what often gives riſe to ſuch excreſcences.

Poll evil, Fiſtula, &c.

Various are the remedies preſcribed for this diſorder: the uſual way is to rub the ſplent with a round ſtick or the handle of a hammer till it is almoſt raw, and then touch it with oil of origanum. Others lay on a pitch-plaſter, with a little ſublimate or arſenic, to deſtroy the ſubſtance; ſome uſe oil of vitriol; ſome tincture of cantharides: all which methods have at times ſucceeded; only they are apt to leave a ſcar, with the loſs of hair. Thoſe applications that are of a more cauſtic nature often do more hurt than good, eſpecially when the ſplent is grown very hard, as they produce a rottenneſs, which keeps running ſeveral months before the ulcer can be healed, and then leaves an ugly ſcar.

According to Mr Taplin, the only expectation of cure "without anxiety and difficulty, is to be careful in obſerving ſuch appearance, in their earlieſt ſtate; and then ſeeing that frequent friction is uſed for a conſiderable time, twice every day, with the utmoſt force of the operator's hands, letting the part be well moiſtened, after each time of rubbing, with a proportion of the following liniment, leaving a pledget of tow wet with the ſame, bound on pretty firm with two yards of wide tape as a roller:

"Take camphorated ſpirits of wine, and ſpirits of turpentine, of each four ounces (a quarter of a pint). Mix together.

"Or, Oil of origanum and ſpirits of turpentine, each half an ounce; camphorated ſpirits of wine, two ounces.—Mix.

"When this plan has been perſevered in for ten days or a fortnight, you will then be able to judge whether any perceptible advantage has been obtained from the force of theſe powerful repellents: if not, procure two ounces of the ſtrongeſt mercurial ointment, and let the ſize of a hazel-nut be well rubbed in upon the part affected, every night and morning, till the whole is conſumed, uſing the roller each night, and taking it off in the morning. If this does not ſucceed, the beſt and moſt ſpeedy method will be the immediate extirpation, by making a longitudinal inciſion ('without bruiſing, hammering,' &c.) through the integuments, diſſecting and extracting the ſubſtance, completing the cure by taking up a couple of ſtitches, and treating it as a ſuperficial wound; for which directions will be found under that head."

Sect. XXXII. *Of the Poll-evil; Fiſtula, and Bruiſes on the Withers; Warbles on the Back, and Sit-faſts.*

1. The *poll-evil* is an abſceſs near the poll of a horſe, formed in the ſinuſes between the poll-bone and the uppermoſt vertebræ of the neck.

If it proceeds from blows, bruiſes, or any external violence, at firſt bathe the ſwelling often with hot vinegar; and if the hair be fretted off with an ouſing, through

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Poll-evil, Fiſtula, &c.

through the ſkin, make uſe of two parts of vinegar and one of ſpirit of wine; but if there be an itching, with heat and inflammation, the ſafeſt way is to bleed, and apply poultices with bread, milk, and elder flowers: this method, with the aſſiſtance of phyſic, will frequently diſperſe the ſwelling and prevent this evil.

But when the tumour is critical, and has all the ſigns of matter, the beſt method then is to forward it by applying the ripening poultices already taken notice of, till it comes to maturity, and burſts of itſelf; or if opened with a knife, great care ſhould be taken to avoid the tendinous ligament that runs along the neck under the mane; when matter is on both ſides, the opening muſt be made on each ſide, and the ligament remain undivided.

If the matter flows in great quantities, reſembles melted glue, and is of an oily conſiſtence, it will require a ſecond inciſion, eſpecially if any cavities are diſcovered by the finger or probe; theſe ſhould be opened by the knife, the orifices made depending, and the wound dreſſed with the common digeſtive of turpentine, honey, and tincture of myrrh, and, after digeſtion, with the precipitate ointment; or waſh with the following made hot, and fill up the cavity with tow ſoaked in it:

VINEGAR or ſpirit of wine half a pint, white vitriol diſſolved in ſpring-water half an ounce, tincture of myrrh four ounces.

This may be made ſharper by adding more vitriol; but if the fleſh is very luxuriant, it ſhould firſt be pared down with a knife before the application. With this waſh alone Mr Gibſon has cured this diſorder without any other formality of dreſſing, waſhing with it twice a day, and laying over the part a quantity of tow ſoaked in vinegar and the white of eggs beat together.

But the moſt compendious method of cure, is that by *ſcalding*, as the farriers term it; and which uſed to be proſecuted when the ſore was foul, of a bad diſpoſition, and attended with a profuſion of matter. But the cruelty, abſurdity, and inutility of the practice have become ſo apparent, as that it ſeems now to be almoſt univerſally exploded; ſo that it would be ſuperfluous to give any deſcription of the operation.

2. *Bruiſes* on the *withers* frequently impoſthumate, and for want of care turn fiſtulous. They ariſe often from pinches of the ſaddle, and ſhould be treated with repellers: for this purpoſe bathe the tumor well with hot vinegar three or four times a-day; if that does not ſucceed alone, an ounce of oil of vitriol may be put to a quart of vinegar, or half an ounce of white vitriol diſſolved in a little water, and added to the ſame quantity. Theſe are generally held as very effectual repellers for this purpoſe in horſes, and will frequently prevent impoſthumation: when the ſwelling is attended with heat, ſmarting, and little hot watery pimples, the following mixture will then be more proper to bathe with.

TAKE two ounces of crude ſal ammoniac, boiled in a quart of lime-water; where that cannot be had, a handful of pearl or wood aſhes may be boiled in common water: pour off the decoction when ſettled, and mix with it half a pint of ſpirit of wine: anoint the part afterwards with linſeed oil, or elder ointment, to ſoften and ſmooth the ſkin.

But when the ſwellings are critical, the conſequence of a fever ſettled on this part, you muſt avoid the repelling method, and aſſiſt in bringing the ſwelling to matter, by means of ſuppurating poultices: experienced farriers adviſe, never to open theſe tumors till they break of themſelves: for if they are opened before they are ripe, the whole ſore will be ſpongy, and diſcharge a bloody ichor, which ſoon degenerates into a ſordid ulcer. But take care to enlarge the openings, and pare away the lips, that your dreſſings may be applied eaſily; and avoid the ligament which runs along the neck to the withers: if a gathering forms on the oppoſite ſide, open it in the ſame manner; but take care they incline downwards, for the ſake of depending orifices, and letting the matter flow off eaſily. For the method of dreſſing, we muſt refer to the former part of this Section; and if the bones ſhould be found foul, they muſt be dreſſed with tincture of myrrh till they ſcale off. If the fungus is very troubleſome, and the diſcharge oily, yellow, and viſcid, pledgets ſoaked in the following, made hot, have been found very effectual, bathing the ſwelling round with ſpirit of wine and vinegar:

TAKE half an ounce of blue vitriol diſſolved in a pint of water; oil of turpentine, and rectified ſpirit of wine, of each four ounces; white-wine vinegar, ſix ounces; oil of vitriol and Ægyptiacum, of each two ounces.

When the cavities are truly fiſtulous, the calloſities muſt be cut out, where it can be done, with a knife; and the remainder deſtroyed by corroſives.

3. *Warbles* are ſmall hard tumors under the ſaddle-part of the horſe's back, occaſioned by the heat of the ſaddle in travelling, or its uneaſy ſituation. As ſoon as the ſaddle is taken off after a ſevere chaſe or hard journey, a good groom or hoſtler will be very minute in his examinations to diſcover whether an injury has been ſuſtained in this part or any other. He will inſtantly perceive, by the horſe's wincing, whether there is any defect from which a warble may ſpeedily enſue; if ſo, upon the firſt appearance, or earlieſt diſcovery, bathe three or four times a-day with the following repellent:

EXTRACT of Saturn half an ounce, camphorated ſpirit of wine two ounces, ſoft water a quarter of a pint; the extract and ſpirit being well mixed by ſhaking, before adding the water.

4. *A fiſt-faſt* proceeds generally from a warble, and is the horſe's hide turned horny or callous. In ſome little time the hair comes off, and it bears the appearance of a foreign ſolid ſubſtance, fixed in the centre of what ſeems to be a ſuperficial wound. For this ſimple and very trifling complaint there is but one certain and expeditious cure, namely, *extirpation*; which may be performed with a common penknife. But the moſt ready and leaſt painful method of taking it off is by juſt raiſing either edge till it can be taken hold of with a pair of common pincers; when, by leaning them to any ſide, you have an immediate fulcrum, or lever, and ſeparate it inſtantaneouſly without pain or inconvenience. After the extirpation, it may be treated as a ſimple ſuperficial laceration, and may in general be healed by a frequent application of Friar's balſam, tincture of myrrh, or even with a little common brandy. Due care, however, ſhould always be taken to guard the cicatrix in its infancy, and prevent the buckle

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Poll-evil, Fistula, &c.

buckle of the girth from coming into direct contact with the injured part, not only till the surface is sufficiently hardened to render a repetition unlikely, but upon all future occasions.

Some parts of the above treatment of tumors, however, has been condemned, and a more simple method by means of setons recommended, by that judicious practitioner Mr Clark of Edinburgh. "The common method (says he†) of treating those large tumors which are seated on the upper part of the neck, immediately behind the ears, generally known by the name of the *poll-evil*, and those which are seated on the withers or upper parts of the shoulders, is exceedingly improper. They are either allowed to break of themselves, or are opened the whole length of the tumor on the upper part. In this situation, especially in the poll-evil, when the head is always kept in an erect position, the matter contained in the tumor cannot be discharged from it, but is retained in the bottom of the wound, and exposed to the external air, &c.: it soon acquires a most ichorous corroding quality, and produces one of the largest and the most sordid fistulous ulcers that horses are infested with: a great quantity of fungous or proud flesh is soon produced; this requires to be repeatedly extirpated with the knife, the loss of which cannot be again supplied; hence the horse is greatly disfigured, the cure becomes both tedious and uncertain, and is seldom radical. In some cases, I have known the vertebræ of the neck affected by the sharpness of the confined matter, forming lodgments there, and, after great trouble and expence, the horses were put to death.

† *Treatise on the Prevention of the Diseases of Horses*, p. 245.

"All these kinds of tumors, &c. are easily and speedily discussed by the use of setons, without any loss of substance, or disfiguring of the parts, and cured with the greatest certainty when the operation is properly performed. Of a number of cases, in my practice, where this operation has succeeded with great expedition in curing these tumors, I shall only mention the following.

"About six years ago, an Arabian horse, belonging to a gentleman in this place, had a large tumor seated a little on one side of the withers, or upper part of the shoulder; it was forwarded by applying emollient poultices; and as soon as the matter was perceived to fluctuate in the tumor, a large seton needle, armed with a cord at the other end, was introduced at the upper part of the swelling, and brought out at the under or lowermost part of it; the matter was discharged at the lower orifice in a very short time, the tumor was by that means soon discussed, and, in a few weeks, it was entirely healed up, without any scar or blemish remaining, farther than a little baldness about the lower orifice, occasioned by the sharpness of the matter, which likewise soon disappeared, and not the least trace of the disorder remained.

"The other case happened about seven years ago: a coach-horse (belonging to a nobleman in the neighbourhood) had a large tumor a little behind the ears, on the neck, which I have formerly observed is called the *poll-evil*; the tumor extended to both sides of the neck, and was divided in the middle by the mane; the tumor had been opened on one side, in a very superficial manner, by a farrier in the country, before the matter in it was sufficiently digested; after applying a few emollient poultices, in order to ripen it, a strong seton needle, was introduced at the upper part of it, almost close to the mane, and after passing it through the bottom of the tumor, which was very deep, the needle was brought out through the sound muscular parts below the tumor, in order to procure a sloping or depending orifice for the matter to run freely off. The same operation was likewise performed on the opposite side, beginning near the mane, and finished in the same manner. In a few weeks the cure was completed. The horse run for several years in the same nobleman's carriage, without the smallest vestige of his former disorder.

Wind-galls, Blood and Bog-Spavins.

"From this method of treating these tumors, together with the use of alterative medicines, &c. which in cases of this nature ought never to be omitted, they were entirely discussed, and the perforations made by the needle soon healed up, without the least deformity of the parts. I have therefore given the history of these cases, to show with what facility and expedition such tumors may be carried off by the use of setons, in preference to the common methods used, and even recommended by different authors; such as, after opening these tumors by deep incisions, and pouring into them the most corrosive mixtures, made scalding hot, together with a long tedious course of hot irritating applications, by which the poor animals are kept in the utmost torture for a considerable time, and in the end are so disfigured by the loss of substance, occasioned by the cutting away so much of the flesh from the parts, that such horses are generally rendered unfit for any thing but the meanest drudgery.

"Deep-seated abscesses are cured in the same manner by the use of setons; after tracing the sinuses or cavities of the abscess with a long slender blunt lead probe (which yields easily without forcing its way through the cellular membrane, or taking a direction between the interstices of the muscles), the needle, armed with a cord, should follow the direction of the *sinews* or *pipes*, as they are commonly called, to the most depending part; and in case there should be two or more sinuses, which sometimes happens, each of them should be treated in the same manner, in order to obtain a depending orifice for a free discharge of the matter, and which being once procured, seldom fails of completing a cure."

Sect. XXXIII. *Of Wind-galls Blood and Bog-Spavins.*

1. A Wind-gall is a flatulent swelling, which yields to the pressure of the finger, and recovers its shape on the removal thereof; the tumor is visible to the eye, and often seated on both sides of the back sinew, above the fetlocks, on the fore-legs, but most frequently on the hind-legs; though they are met with in various parts of the body, wherever membranes can be so separated, that a quantity of air and serosities may be included within their duplicatures.

When they appear near the joints and tendons, they are generally caused by strains or bruises on the sinews, or the sheath that covers them; which, by being overstretched, have some of their fibres ruptured; whence probably may ooze out that fluid which is commonly found with the included air: though, where these swellings,

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Wind-galls, Blood and Bog-Spavins.

ings ſhow themſelves in the interſtices of large muſcles, which appear blown up like bladders, air alone is the chief fluid; and theſe may ſafely be opened, and treated as a common wound.

On the firſt appearance of wind-galls, their cure ſhould be attempted by reſtringents and bandage: for which purpoſe, let the ſwelling be bathed twice a-day with vinegar, or verjuice alone; or let the part be fomented with a decoction of oak-bark, pomegranate, and alum boiled in verjuice, binding over it, with a roller, a woollen cloth ſoaked in the ſame. Some, for this purpoſe, uſe red-wine lees, others curriers ſhavings, wetted with the ſame, or vinegar, bracing the part up with a firm bandage.

If this method, after a proper trial, ſhould not be found to ſucceed, authors have adviſed the ſwelling to be pierced with an awl, or opened with a knife: but mild bliſtering has in general the preference given to theſe methods; the included fluids being thereby drawn off, the impacted air diſperſed, and the tumor gradually diminiſhed.

2. A *blood-ſpavin* is a ſwelling and dilatation of the vein that runs along the inſide of the hock, forming a little ſoft ſwelling in the hollow part, and is often attended with a weakneſs and lameneſs of the hock.

The cure ſhould be firſt attempted with the reſtringents and bandage above recommended, which will contribute greatly to ſtrengthen all weakneſſes of the joints, and frequently will remove this diſorder if early applied; but if by theſe means the vein is not reduced to its uſual dimenſions, the ſkin ſhould be opened, and the vein tied with a crooked needle and wax-thread paſſed underneath it, both above and below the ſwelling, and the turgid part ſuffered to digeſt away with the ligatures: for this purpoſe, the wound may be daily dreſſed with turpentine, honey, and ſpirit of wine, incorporated together.

3. A *bog-ſpavin* is an encyſted tumor on the inſide of the hough; or, according to Dr Bracken, a collection of browniſh gelatinous matter, contained in a bag or cyſt, which he thinks to be the lubricating matter of the joint altered, the common membrane that incloſes it forming the cyſt. This caſe he has taken the pains to illuſtrate in a young colt of his own, where he ſays, When the ſpavin was preſſed hard on the inſide the hough, there was a ſmall tumor on the outſide, which convinced him the fluid was within ſide the joint: he accordingly cut into it; diſcharged a large quantity of this gelatinous matter; dreſſed the ſore with doſſils dipped in oil of turpentine; putting into it, once in three or four days, a powder made of calcined vitriol, alum, and bole: by this method of dreſſing, the bag ſloughed off, and came away, and the cure was ſucceſsfully completed without any viſible ſcar.

This diſorder, according to the above deſcription, will ſcarcely ſubmit to any other method, except firing, when the cyſt ought to be penetrated to make it effectual; but in all obſtinate caſes that have reſiſted the above methods, both the cure of this and of the ſwellings called *wind-galls* ſhould be attempted in this manner. If, through the pain attending the operation or dreſſings, the joint ſhould ſwell and inflame, foment it twice a-day, and apply a poultice over the dreſſings till it is reduced.

Sect. XXXIV. *Of Mallenders and Sallenders.*

Mallenders and Sallenders.

Mallenders are cracks in the bend of the horſe's knee, that diſcharge a ſharp indigeſted matter; they are often the occaſion of lameneſs, ſtiffneſs, and the horſe's tumbling.

Sallenders are the ſame diſtemper, ſituated on the bending of the hough, and occaſion a lameneſs behind.

They are both cured by waſhing the parts with a lather of ſoap warmed, or old chamber-lye; and then applying over the cracks a ſtrong mercurial ointment ſpread on tow, with which they ſhould be dreſſed night and morning, till all the ſcabs fall off; if this ſhould not ſucceed, anoint them night and morning with a little of the following, and apply the above ointment over it.

Take hog's lard two ounces, ſublimate mercury two drams.

Or, Take hog's lard two ounces, oil of vitriol two drams.

Take the next from Gibſon, which is to be depended on:

Æthiop's mineral half an ounce, white vitriol one dram, ſoft green ſoap ſix ounces.

Anoint with this often; but firſt clip away the hair, and clear the ſcabs. On their drying up, it may be proper to give a gentle purge or two; or the nitre-balls may be taken advantageouſly for a fortnight or three weeks.

Sect. XXXV. *Of Lampas, Barbs, and Wolves-Teeth.*

1. The *lampas* is an excreſcence in the roof of the horſe's mouth, which is ſometimes ſo luxuriant, that it grows above the teeth, and hinders his feeding. The cure is in lightly cauteriſing the fleſh with a hot iron, taking care that it does not penetrate too deep ſo as to ſcale off the thin bone that lies under the upper bars; the part may be anointed with burnt alum and honey, which is proper for moſt ſores in the mouth.

This operation is by ſome thought to be entirely unneceſſary; it being a general obſervation with them, that all young horſes have their mouths more or leſs full of what are called *lampas*; and that ſometimes they riſe higher than the fore-teeth; but they further obſerve, in proportion as a horſe grows older, the roof flattens of itſelf, and the teeth then appear to riſe. We are obliged to the ingenious M. La Foſſe for this remark, and hope it will be the means of aboliſhing this cruel and unneceſſary operation.

2. *Barbs* are ſmall excreſcences under the tongue, which may be diſcovered by drawing it aſide, and are cured by cutting cloſe off, and waſhing with brandy or ſalt and water.

3. A horſe is ſaid to have *wolves-teeth*, when the teeth grow in ſuch a manner, that their points prick or wound either the tongue or gums in eating. Old horſes are moſt liable to this infirmity, and whoſe upper overſhoot the under teeth in a great degree.

To remedy this evil, you may either chop off the ſuperfluous parts of the teeth with a chiſſel and mallet, or file them down, which is the better way, till you have ſufficiently waſted them.

Sect.

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Grease.

Sect. XXXVI. *Of the Grease.*

In order to treat this diſorder with ſome propriety, we ſhall conſider it as ariſing from two different cauſes; a fault or relaxation in the veſſels, or a bad diſpoſition in the blood and juices. We muſt here obſerve, that the blood and juices (or humours, for there are always ſome in the beſt ſtate of blood) are brought to the extreme parts by the arteries, and returned by the veins; in which latter, the blood is to riſe in perpendicular columns, to return the circulating fluids from the extremities: hence ſwellings in the legs of horſes may eaſily be accounted for, from a partial ſtagnation of the blood and juices in the finer veſſels, where the circulation is moſt languid; and eſpecially when there is want of due exerciſe, and a proper muſcular compreſſion on the veſſels, to puſh forward the returning blood, and propel the inert and half-ſtagnating fluids through their veſſels; in ſhort, the blood in ſuch caſes cannot ſo readily aſcend as deſcend, or a greater quantity is brought by the arteries than can be returned by the veins.

The greaſe then, conſidered in this light, muſt be treated as a local complaint, where the parts affected are alone concerned, the blood and juices being yet untainted, and in good condition; or as a diſorder where they are both complicated: but when it is an attendant on ſome other diſtemper, as the farcy, yellows, dropſy, &c. ſuch diſeaſes muſt firſt be cured before the greaſe can be removed. In the former caſe, moderate exerciſe, proper dreſſing, cleanlineſs, and external application, will anſwer the purpoſe: in the latter, internals muſt be called in to our aſſiſtance, with proper evacuations.

When a horſe's heels are firſt obſerved to ſwell in the ſtable, and ſubſide or go down on exerciſe; let care be taken to waſh them very clean every time he comes in, with ſoap-ſuds, chamber-lye, or vinegar and water; which, with proper rubbing, will frequently prevent or remove this complaint: or let them be well bathed twice a-day with old verjuice, or the following mixture, which will brace up the relaxed veſſels; and if rags dipped in the ſame are rolled on, with a proper bandage, for a few days, it is moſt likely the ſwellings will ſoon be removed by this method only, as the bandage will ſupport the veſſels till they have recovered their tone. To anſwer this end alſo, a laced ſtocking made of ſtrong canvas or coarſe cloth, neatly fitted to the part, would be found extremely ſerviceable, and might eaſily be contrived by an ingenious mechanic.

Take rectified ſpirit of wine four ounces; diſſolve in it half an ounce of camphor: to which add wine-vinegar or old verjuice ſix ounces; white vitriol diſſolved in a gill of water one ounce; mix together, and ſhake the phial when uſed.

But if cracks or ſcratches are obſerved, which ooze and run, let the hair be clipped away, as well to prevent a lodgment (which becomes ſtinking and offenſive by its ſtay), as to give room for waſhing out dirt or gravel, which, if ſuffered to remain there, would greatly aggravate the diſorder.

When this is the caſe, or the heels are full of hard ſcabs, it is neceſſary to begin the cure with poultices, made either of boiled turnips and lard, with a handful of linſeed powdered; or oat-meal and rye-flour, with a little common turpentine and hog's-lard, boiled up with ſtrong-beer grounds or red-wine lees. The digeſtive ointment being applied to the ſores for two or three days, with either of theſe poultices over it, will, by ſoftening them, promote a diſcharge, unload the veſſels, and take down the ſwelling; when they may be dried up with the following:

Take white vitriol and burnt alum, of each two ounces; *Ægyptiacum* one ounce; lime water a quart or three pints: waſh the ſores with a ſponge dipped in this three times a-day; and apply the common white ointment ſpread on tow, to an ounce of which may be added two drams of ſugar of lead.

This method is generally very ſucceſsful, when the diſtemper is only local, and requires no internal medicines; but if the horſe be full and groſs, his legs greatly gorged, ſo that the hair ſtares up, and is what ſome term pen-feathered, and has a large ſtinking diſcharge from deep foul ſores, you may expect to meet with great trouble, as theſe diſorders are very obſtinate to remove, being often occaſioned by a poor dropſical ſtate of blood, or a general bad diſpoſition in the blood and juices.

The cure in this caſe, if the horſe is full and fleſhy, muſt be begun by bleeding, rowels, and repeated purging; after which, diuretic medicines are frequently given with ſucceſs. Thus,

Take four ounces of yellow roſin, one of ſal prunellæ; grind them together with an oiled peſtle; add a dram of oil of amber; and give a quart of forge-water every morning, faſting two hours before and after taking, and ride moderately.

As this drink is found very diſagreeable to ſome horſes, we would recommend the nitre-balls in its ſtead, given to the quantity of two ounces a-day for a month or ſix weeks, mixed up with honey or in his feeds. Take the following alſo for that purpoſe, or the diuretic balls directed under *Diſorders of the Eyes*.

Yellow roſin four ounces; ſalt of tartar, and ſal prunellæ, of each two ounces; Venice ſoap, half a pound; oil of juniper, half an ounce; make into balls of two ounce weight, and give one every morning.

The legs in this caſe ſhould be bathed or fomented, in order to breathe out the ſtagnant juices, or to thin them, ſo that they may be able to circulate freely in the common current. For this purpoſe, foment twice a-day with the diſcutient fomentation (p. 143. col. 2.), in which a handful or two of wood-aſhes has been boiled; apply then the above poultices, or the following, till the ſwelling has ſubſided, when the ſores may be dreſſed with the green ointment till they are properly digeſted, and then dried up with the water and ointment above recommended.

Take honey one pound; turpentine ſix ounces; incorporate with a ſpoon; and add of the meal of fenugreek and linſeed each four ounces; boil in three quarts of red-wine lees to the conſiſtence of a poultice; to which add, when taken from the fire, two ounces of camphor in powder; ſpread it on thick cloths, and apply warm to the legs, ſecuring it on with a ſtrong roller.

If the ſores are very foul, dreſs them with two parts of

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Scratches, Crown-scabs, &c.

of the wound-ointment, and one of Ægyptiacum; and apply the following, ſpread on thick cloths, and rolled on.

Take of black ſoap one pound; honey half a pound; burnt alum four ounces; verdigreaſe powdered two ounces; wheat-flour a ſufficient quantity.

If the diuretic balls ſhould not ſucceed, they muſt be changed for the antimonial and mercurial alteratives, already mentioned; but turning a horſe out in a field, where he has a hovel or ſhed to run to at pleaſure, would greatly contribute to quicken the cure, and indeed would in general effect it alone; but if this cannot be complied with, let him be turned out in the day-time.

If the horſe is not turned out, a large and convenient ſtall is abſolutely neceſſary, with good dreſſing and care.

The laſt thing we ſhall recommend, is a method to oblige a horſe to lie down in the ſtable. This undoubtedly is of the utmoſt conſequence, as it will not a little contribute to the removal and cure of this diſorder; for by only changing the poſition of his legs, a freer circulation would be obtained, and the ſwelling taken down; whereas in general it is greatly aggravated by the obſtinacy of the horſe, who refuſes to lie down at all (probably from the pain it gives him to bend his legs for that purpoſe), by which means the ſtiffneſs and ſwelling increaſes, till the over-gorged and diſtended veſſels are obliged to give way; and by burſting, diſcharge the fluids, which ſhould circulate thro' them.

Sect. XXXVII. *Of Scratches, Crown-ſcabs, Rat-tails, and Capellets.*

1. Scratches in the heels have ſo much affinity with the greaſe, and are ſo often concomitants of that diſtemper, that the method of treating them may be ſelected chiefly from the preceding ſection; which at firſt ſhould be by the linſeed and turnip poultice, with a little common turpentine, to ſoften them and relax the veſſels; the green ointment may then be applied for a few days to promote a diſcharge, when they may be dried up with the ointments and waſhes recommended in the above ſection. It is beſt afterwards to keep the heels ſupple, and ſoftened with currier's dubbing, which is made of oil and tallow. This will keep the hide from cracking, and be as good a preſervative as it is to leather; and, by uſing it often before exerciſe, will prevent the ſcratches, if care is taken to waſh the heels with warm water when the horſe comes in: When they prove obſtinate, and the ſores are deep, uſe the following; but if any cavities or hollow places are formed, they ſhould firſt be laid open; for no foundation can be laid for healing till you can dreſs to the bottom.

Take Venice turpentine four ounces; quickſilver one ounce; incorporate well together by rubbing ſome time; and then add honey and ſheeps ſuet of each two ounces.

Anoint with this once or twice a-day; and if the horſe is full or fleſhy, you muſt bleed and purge; and if the blood is in a bad ſtate, the alteratives muſt be given to rectify it.

2. The *crown ſcab* is an humour that breaks out round the coronet, which is very ſharp and itching, and attended with a ſcurfineſs: ſharp waters prepared with vitriol are generally uſed for the cure; but the ſafeſt way is firſt to mix marſhmallow and yellow baſilicon, or the wound-ointment, equal parts, and to ſpread them on tow, and lay all round the coronet. A doſe or two of phyſic may be very proper, with the diuretic medicines preſcribed in the preceding page, and the alteratives above recommended, in rebellious caſes. *Vide* the Section on *Alteratives*.

Scratches, Crown-ſcabs, &c.

3. *Rat-tails* are excreſcences which creep from the paſtern to the middle of the ſhanks, and are ſo called from the reſemblance they bear to the tail of a rat. Some are moiſt, others dry; the former may be treated with the drying ointment and waſhes, p. 153. col. 2. par. 1. the latter with the mercurial ointment preſcribed in the Section of *Strangles*, p. 129. col. 2. If the hardneſs does not ſubmit to the laſt medicine, it ſhould be pared off with a knife, and dreſſed with turpentine, tar, and honey, to which verdigreaſe or white vitriol may occaſionally be added; but before the uſe of the knife, you may apply this ointment.

Take black ſoap four ounces, quick lime two ounces, vinegar enough to make an ointment.

4. There are particular ſwellings which horſes are ſubject to, of a wenny nature, which grow on the heel of the hock, and on the point of the elbow, and are called by the French and Italians *capellets*: they ariſe often from bruiſes and other accidents; and when this is the caſe, ſhould be treated with vinegar and other repellers. But when they grow gradually on both heels or elbows, we may then ſuſpect the blood and juices in fault, and that ſome of the veſſels are broke and juices extravaſated: in this caſe the ſuppuration ſhould be promoted, by rubbing the part with marſhmallow ointment; and when matter is formed, the ſkin ſhould be opened with a lancet, in ſome dependent part towards one ſide, to avoid a ſcar; the dreſſings may be turpentine, honey, and tincture of myrrh. The relaxed ſkin may be bathed with equal parts of ſpirit of wine and vinegar, to which an eighth part of oil of vitriol may be added. The contents of theſe tumors are various; ſometimes watery; at others ſuety, or like thick paſte; which, if care be not taken to digeſt out properly with the cyſt, will frequently collect again. Was it not for the diſfigurement, the ſhorteſt method would be to extirpate them with a knife, which if artfully executed, and the ſkin properly preſerved, would leave very little deformity.

Sect. XXXVIII. *Of Ruptures, Anticor, Diſeaſes of the Mouth, and Colt-evil or Gonorrhœa.*

1. In regard to *ruptures*, though they are generally divided into particular claſſes, we ſhall only obſerve, that by violent efforts of the horſe, or other accidents, the guts or caul may be forced between the muſcles of the belly at the navel, and through the rings of the muſcles into the ſcrotum or cod. The ſwellings are generally about the ſize of a man's fiſt, ſometimes much larger, deſcending to the very hock: they are frequently ſoft, and yield to the preſſure of the hand, when they will return into the cavity of the belly with a rumbling noiſe: and, in moſt, the vacuity may be felt through which they paſſed.

On their firſt appearance, endeavours ſhould be made to

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Ruptures, Anticor, &c.

to return them by the hand; but if the ſwelling ſhould be hard and painful, in order to relieve the ſtricture, and relax the parts through which the gut or caul has paſſed, let a large quantity of blood be immediately taken away, and the part fomented twice or thrice a-day, applying over it a poultice made of oatmeal, oil, and vinegar, which ſhould be continued till the ſwelling grows ſoft and eaſier, or the gut is returned. In the mean time, it would be proper to throw up emollient oily glyſters twice a-day, and to let the horſe's chief diet be boiled barley, ſcalded malt, or bran.

Should the ſwelling afterwards return, we apprehend the reſtringent applications, uſually recommended on theſe occaſions, will avail little without a ſuſpenſory bandage; ſo that an ingenious mechanic in that art is chiefly to be relied on for any future aſſiſtance; though it has been obſerved, that with moderate feeding, and gentle exerciſe, ſome horſes have continued to be very uſeful under this complaint.

2. The *anticor* is a diſorder not very common among our horſes, or thoſe in northern climates; but is particularly taken notice of by the French, Spaniſh, and Italian writers; who deſcribe it a malignant ſwelling in the breaſt, which extends ſometimes to the very ſheath under the belly; it is attended with a fever, great depreſſions and weakneſs, and a total loſs of appetite.

The cure ſhould be firſt attempted by large and repeated bleedings, to abate the inflammation; emollient glyſters ſhould be injected twice or thrice a-day, with an ounce of ſal prunella in each, and the cooling drink in the Section on *Fevers* ſhould be given inwardly; the ſwelling ſhould be bathed with the marſhmallow ointment; and a ripening poultice, with onions boiled in it, ſhould be applied over it. If by this method, continued four or five days, the inflammation in the throat and gullet is removed, our attention ſhould more particularly turn to encourage the ſwelling at the breaſt, and bring it, if poſſible, to matter: to which end, continue the poultice, and give two ounces of Venice treacle diſſolved in a pint of beer every night; when the ſwelling is grown ſoft, it muſt be opened with the knife, and dreſſed with turpentine digeſtive, the danger now being over.

But ſhould it be found impracticable to bring the ſwelling to matter, and it increaſes upwards, ſo as to endanger ſuffocation; authors have adviſed to pierce the tumor with a hot pointed cautery in five or ſix places; to dreſs with the above digeſtive; and, in order to ſtimulate and promote a greater diſcharge, to add to it a ſmall quantity of Spaniſh flies and euphorbium in powder; fomenting at the ſame time, and bathing the circumjacent parts with ointment of marſhmallows. M. Gueriniere, as well as Soleyſel, have adviſed opening the ſkin, when the tumor cannot be brought to matter, in order to introduce a piece of black hellebore-root ſteeped in vinegar, and to confine it there for 24 hours: this alſo is intended as a ſtimulant; and is ſaid to anſwer the intention, by occaſioning ſometimes a ſwelling as big as a man's head.

3. Beſides the diſorders of the mouth, which we have already animadverted on, there are frequently obſerved on the inſide the lips and palate, little ſwellings or bladders called *giggs*. Slitting them open with a knife or lancet, and waſhing them afterwards with ſalt and vinegar, is in general their cure; but when they degenerate into what are called *cankers*, which are known by little white ſpecks, that ſpread and occaſion irregular ulcers, the beſt method then is to touch them daily with a ſmall flat cautery, moderately heated till the ſpreading is ſtopped, and to rub the ſores three or four times a day with Ægyptiacum, and tincture of myrrh ſharpened with oil or ſpirit of vitriol; when by this dreſſing the ſloughs are ſeparated, they may be waſhed frequently with a ſponge dipped in copperas, or ſublimate water, if they continue to ſpread; or a tincture made by diſſolving half an ounce of burnt alum, and two ounces of honey, in a pint of tincture of roſes. Either of theſe will dry them up, and are very uſeful in moſt diſorders of the mouth.

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A relaxation and ſwelling of the palate ſometimes happens to horſes on catching cold. To remedy this diſorder, blow pepper on the part, or anoint it with the ſame mixed up with honey. The tincture above mentioned may be uſed for this purpoſe, to which may be added half an ounce of ſpirit of ſal ammoniac.

4. The *colt-evil* is ſuppoſed to ariſe from ſtoned colts having full liberty with mares, before they are able to cover them; whence frequently enſues an excoriation or fretting on the glands and a ſwelling on the ſheath. This laſt diſorder frequently proceeds too from dirt or filth lodging there, and is often removed by waſhing the part clean with butter and beer: but when the yard itſelf is ſwelled, foment it twice a-day with marſhmallows boiled in milk, to which may be added a little ſpirit of wine; anoint the excoriation with the white ointment, or waſh it with a ſponge dipped in lime, to a pint of which may be added two drams of ſugar of lead: the yard ſhould be ſuſpended up to the belly; and if the ſwelling ſhould increaſe with the inflammation, bleed, and give the cooling phyſic, anoint with ointment of alder, and apply the bread-and-milk poultice.

If a ſimple gonorrhœa or ſeminal gleet is obſerved to drip from the yard (which is often the caſe in high-fed young horſes, where a relaxation of the glands and ſeminal veſſels has been brought on by frequent emiſſions), let the horſe be plunged every day into a river or pond; give him two or three rhubarb purges, at proper diſtances; and intermediately the following balls.

Take of balſam of copivi, or Venice turpentine, olibanum, and maſtich powdered, of each two drams; bole armeniac, half an ounce: mix up into a ball with honey, and give it night and morning till the diſcharge leſſens, and then every night till it goes off.

Balls prepared with rhubarb and turpentine may alſo be given for this purpoſe; two drams of the former with half an ounce of the latter.

Sect. XXXIX. *Preliminary Remarks on* Diseases *of the* Feet.

I. *Of Greaſing, Oiling, and Stuffing Horſes Hoofs.* The cuſtom of keeping our fineſt horſes conſtantly ſtanding upon dry litter and hot dung in the ſtable, is exceedingly hurtful to the feet and legs, particularly the former, which are always found to agree beſt with coolneſs and moiſture. Hence we find, that horſes hoofs, whilſt running in the fields, are always in bet-

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ter condition than those that are kept hot and dry in the stable, which, beside being liable to many diseases, are hard, brittle, shattered, and often broken.

With respect to greasy or oily applications, so often prescribed for the hoofs of horses in order to preserve them sound, tough, &c. Mr Clark * very justly condemns them as rather pernicious than salutary.

* *Observations on the Shoeing of Horses, and on the Diseases of their Feet;* from which judicious performance the following sections are extracted.

When young horses (he observes) are first taken from the fields, their hoofs are cool, sound, and tough. These are found from experience to be good qualities. But horses are no sooner introduced into the stable, than their hoofs are greased or oiled two or three times a-week: and if they are kept much in the house standing upon hot dry litter, without being frequently led abroad, and without having an opportunity of getting their hoofs cooled and moistened in wet ground, their hoofs grow so brittle, dry, and hard, that pieces frequently break off, like chips from a hard stone; and, when driving the nails in shoeing, pieces will split off, even although the nails are made very fine and thin. Now, if these same horses with brittle shattered hoofs are turned out to graze in the fields, their hoofs in time will become, as they were originally, sound, tough, and good.

This change must undoubtedly be ascribed to the wet and moisture which the hoofs are exposed to in the fields, of which water is the principal ingredient; and it is a certain fact, of which we have daily proofs, that when all other means fail, horses are turned out to grass in order to recover their decayed brittle hoofs. It is known, that the hoofs of horses are porous; and that insensible perspiration is carried on through these pores, in the same manner, and according to the same laws, as take place in other parts of the body. Now, every body knows, that greasy or oily medicines applied to the skin of the human body, prevent perspiration, which is frequently attended with the worst consequences. The same reasoning will hold with respect to the hoofs of horses; for greasy or oily applications close or shut up the pores of the hoof, by being absorbed or sucked into its inner substance. Hence the natural moisture which should nourish the hoof, is thereby prevented from arriving at its surface; which, on that account, becomes as it were dead, and consequently dry, brittle, and hard.

The original practice of greasing or oiling horses hoofs, had probably taken its rise, from observing, that grease or oil softened dead substance, such as leather, &c. But this will by no means apply to the hoofs of horses, as there is a very great difference between the living and dead parts of animals; the former having juices, &c. necessary for their own nourishment and support, whilst the latter require such applications as will preserve them from decaying and rotting.

The dealers in horses about London, when they get a bad-footed horse in their hands, moisten his hoofs frequently in water; for which purpose, they keep a puddle of water and dung at the watering place, that when the horse comes to water, his fore-feet may be sunk in the puddle, by which means they are cooled and moistened twice or thrice every day; so that, whilst they are making up his carcase for the market, his hoofs are likewise repaired, and sufficient to stand the test of a trial upon sale. But no sooner do horses with hoofs of this kind come into other hands, their hoofs at the same time being kept dry and greased, &c. than they degenerate into their former state. Hence the cause of so many complaints that horses turn soon lame after they come from dealers, when, in fact, it proceeds from greasy applications, and neglecting to cool or moisten the hoofs in water; for the careful groom, when airing his master's horses, rather than lead them into a puddle, will go about in order to keep their legs clean and dry.

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Another practice equally pernicious, is the stuffing up horses hoofs (as it is called) with hot resinous, and greasy mixtures, under the notion of cooling and softening them. Various are the prescriptions recommended for this purpose, many of which are of a quite opposite nature to the purpose intended.——There is likewise a great impropriety in stuffing up the hoofs with rotten dung and stale urine: this, it is true, is moisture; but of the very worst kind, on account of the salts contained in the urine, which of itself greatly contribute towards hardening and drying their hoofs, in place of softening them; besides the other bad effects which may arise to the frog, &c. from the rottenness of the dung. But, without commenting upon the various compositions or pompous prescriptions recommended in books, or those handed about as receipts for the softening and stuffing horses hoofs, the author would recommend one which is more natural, and ought not to be despised for its simplicity, as it is only cooling and moistening the hoofs with water morning and evening: And, to those who are fond of stuffing, he would prescribe bran and water, or clay, &c. made into the consistency of a poultice; and, in particular cases, where horses stand much in the stable, and the hoofs are disposed to be very hard, dry, and brittle, a poultice of this kind, or any other emollient composition in which water is a principal ingredient, may be applied all round the hoof; or, in imitation of some dealers, to keep a puddle of water at the watering place, which will answer equally well, if not better. From this manner of treatment, the hoofs will be preserved in their natural state, and a free and equal perspiration kept up, by which the nourishment natural to the hoof will have free access to its surface, as it is this only which causes that cohesion of the parts which constitutes a firm, sound, tough hoof.

II. *Of the natural Defects of the Feet.* It is very well known, that different climates and different soils greatly affect the feet of horses. Those that are bred in hot countries, standing mostly upon dry ground, have deep crushed hollow hoofs with small frogs; for, being but little exposed to wet or moisture, the fibres of the hoof contract more closely. And, even in Great Britain, there is a considerable difference, according to the dryness or wetness of the soil upon which horses are bred. Those that are bred upon the mountainous parts of England and Wales, and in the northern parts of Scotland, have generally good sound tough hoofs; whilst those horses that are bred upon low marshy grounds (which are mostly of the big draught kind), have flat, large, soft hoofs; for being kept too moist, by always soaking in wet, the horny fibres of the hoof are too much relaxed.

Those hoofs which are either too large or too small, in proportion to the size of the body, and thickness of the bones of the legs, are generally, and not without foundation, looked upon as bad. Large broad hoofs, for

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for the most part, have thin flat soles; large, soft, spongy frogs: a strong crust, something hollow upon the upper and fore part, and full of wrinkles or rings, not unlike the rough outside of an oyster-shell. Hoofs of this shape are liable to that disease termed *foundered*; and to have high, round, or swelled soles, and low weak heels, &c.

Small hoofs are liable to the opposite extreme, especially those of that kind which generally go under the denomination of *asses hoofs*, as they are deep crusted and narrow, the sole very hollow, the frog small, the heels high and strong, the crust upon the outside clear and shining: these are naturally disposed to a contraction of the whole hoof, which is called *hoof-bound*; and likewise to corns, running thrushes, or frushes; either of which render a horse lame.

Some hoofs are pretty well proportioned, and look well to the eye; but, at the same time, they are thin and weak crusted, and not able to stand much fatigue in travelling upon hard stoney grounds. On the other hand, very strong crusted hoofs are by no means the best, but are liable to cracks, &c. In such hoofs, the horney fibres appear very distinct, and run in a straight line from the coronet or top of the hoof to its basis, resembling the grain of some kinds of wood, particularly oak. Hence they are disposed to cracks or fissures, which cleave the hoof quite through, sometimes from the coronet down to the bottom of the hoof. In others, these cracks at first do not penetrate through the horn, but appear like a seam on the surface of the hoof, commonly named a *sand crack*; which, from retaining the sand and gravel, at last works its way into the quick, and occasions lameness, &c. Another disadvantage attending very strong crusted hoofs is, that, when they stand long in a dry hot stable, they contract, and by their thickness and hardness bruise the internal parts of the foot. Hence the horse will be lame, though, at the same time, no visible defect will be seen about the hoof, excepting a great heat, pain, and tenderness in his feet; the true cause of which is seldom attended to or known; and hence the horse is said to be lame in some other part, perhaps the shoulders. Low thin heels are weak-crusted, and liable to lameness from injudicious shoeing. The opposite extreme, *viz.* very high heels, is equally bad; as these are subject to corns, and contraction of the hoof; and the deepness of the crust causes a numbness in the feet, and unsteadiness in the horse's going, which make him liable to trip and stumble.

Much has been said by authors, with respect to the different colours of horses hoofs, ascribing different qualities and temperaments to peculiar colours, such as hardness, dryness, brittleness, &c. But it is very well known to practitioners in shoeing horses, that there are good and bad hoofs of all colours; some being naturally weak and disposed to be brittle, whilst others are tough and strong. But a great deal depends upon the management of them in the stable, in keeping them properly moistened, in order to preserve a due medium between these opposite extremes. It is likewise generally remarked by authors, as a sure sign of bad thin hoofs, that, when the shoe-nails are drove high up in the crust, it is, say they, an evidence that the crust is thin, and that there was not sufficient hold, without driving the nails high up. But this can be no true criterion to judge by; for, if the nails can be driven high up in the crust with safety in a thin weak foot, the same may as certainly be done in a strong foot, with more ease and expedition, which indeed is frequently the case.

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To form a right judgment of what may be called a *good hoof*, it must neither be too large nor too small in proportion to the size of the leg: at the same time, its shape must be regular, gradually enlarging from the coronet towards its basis; the crust smooth, even, and free from seams, cracks, or wrinkles; the sole strong, and a little hollow; the heels firm and open; the frog tough, sound, and dry.

Sect. XL. *Wounds in the Feet.*

Wounds in the feet happen frequently, but chiefly from want of proper care, and treating them injudiciously when they are first inflicted.

1. Wounds upon the coronet, or top of the hoof, when superficial, are easily cured, if not neglected or improperly treated. But the most simple wound, by bad management or neglect, may, especially if the horse should happen at the time to be in a bad habit of body, be attended with dangerous consequences: therefore, however trifling they may at first appear, they should be treated with attention.

When large deep wounds are inflicted upon the coronet, from which may be apprehended a great inflammation, and its consequences; to prevent these evils as much as possible, it will be necessary to have recourse to bleeding, and, at the same time, to give such internal remedies as are recommended in inflammatory cases; cooling salts, glysters, &c. together with a low soft diet, keeping the hoof moist and soft with emollient poultices applied around it, which may be made of turnip, mallows, or even bran and water.

Deep wounds upon the coronet are generally made by long sharp caukers upon the heels of the shoes of the opposite foot, penetrating downwards between the coffin-bone and the hoof. In this case, as there is no depending orifice or passage for the matter contained in the wound to be discharged downwards, there is great danger of a fistula or sinuous ulcer being formed; to prevent which, an artificial drain or opening must be made through the hoof, first rasping or paring it very thin upon the outside where the perforation is to be made; then introduce a sharp-pointed instrument, a little bent, into the orifice of the wound, and, passing it to the bottom, force it outwards. This operation will be performed with less pain to the animal, if the instrument be concealed within a canula or hollow tube, till it reaches to the bottom of the wound; when the perforation is to be made by pushing it beyond the extremity of the canula; and, by applying a bandage pretty tight round the coronet, the sides or lips of the wound may be brought into contact and healed up, or a seton may be introduced, and continued till the inflammation, swelling, &c. are removed. If this operation be too long delayed, the matter confined in the wound forms a number of sinuses or fistulæ, which frequently run in different directions under the hoof, and require a large portion of it to be cut away before they can be healed up, leaving an ugly blemish, and a weakness or tenderness on that part of the hoof, which never admits of a thorough cure. But,

by

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by treating it in the manner now mentioned, the annular ligament may be preſerved entire, and a falſe quarter avoided: and, although there may remain an horizontal crack or fiſſure in the hoof where the perforation was made; yet, as the hoof grows downward, it will likewiſe go along with it, and wear out, without leaving a blemiſh or any other bad conſequence.

When the capſular ligament of the coffin-joint is wounded or perforated by any inſtrument, ſo as to admit the external air into its cavity, the glands there ſituated inflame; and, in place of ſecreting a lubricating mild liquor, they diſcharge a ſharp ichorous fluid, which deſtroys and corrodes the very cartilages or griſtles upon the ends of the articulated bones, which at laſt grow together, and form what is termed an *anchyloſis*, and of courſe lameneſs. There are many farriers who boaſt of their having cured wounds in the joints after they were affected with that ſymptom which they call a *joint-water*, that is, a diſcharge of the ſynovia or mucilaginous fluid contained within the cavity of the joint. But what they commonly call a *joint-water*, is only a yellow ſerum or lymph, which is frequently to be met with iſſuing in great abundance from wounds in the legs; and not the ſynovia or fluid contained within the cavity of the joint. Notwithſtanding wounds of this kind happen frequently; yet, ſo little are the generality of practitioners acquainted with the nature of them and their conſequences, that they make no diſtinction betwixt them and thoſe of a more ſimple nature. Hence, therefore, they find themſelves frequently miſtaken in prognoſticating the cure of a wound, to appearance of a very ſimple nature.

It is a certain fact, confirmed by experience, that, when the capſular ligament of any joint is perforated or cut through, there is but little chance of a complete cure being effected, ſo as the horſe may be uſeful for the ſaddle or carriage; although, in other reſpects, to thoſe who are willing to be at the expence, he may, if a ſtrong horſe, be uſeful in ſome kinds of drudgery.

As to the mode of dreſſing wounds of this kind, all that art can do, is to prevent, as much as poſſible, a violent inflammation or flux of humours to the affected limb, by blooding, glyſters, cooling ſalts, together with a low ſoft diet, applying digeſtive poultices to the wound, and injecting now and then into the cavity of the joint tincture of myrrh.

2. Wounds upon the coronet towards the back part of the foot or heel, which are commonly called an *over-reach*, are occaſioned by the toe of the hind-ſhoe on the ſame ſide cutting the fore-heel. Some horſes are much addicted to this, owing entirely to their manner of going, *viz.* the hind-foot moving in the ſame line of direction with the fore-foot; in riding faſt, the fore-foot not giving place in time, the hind-foot ſtrikes againſt the fore-heel: hence ſome horſes, in trotting, make a clattering noiſe with the hind-ſhoes ſtriking againſt the heel of the fore ones; hence, likewiſe, many horſes are thrown down by the ſame cauſe.

Although an over-reach is a wound of the complicated kind, being at the ſame time a contuſion or bruiſe together with a wound; yet they are nowiſe dangerous, and are eaſily cured by treating them in the manner hereafter mentioned; for, in two or three days, when the wound comes to ſuppurate properly, the bruiſed or dead parts fall off, and only leave a larger ſurface of a wound than was at firſt apprehended. Wounds in the Feet.

With reſpect to the dreſſing proper for recent wounds, farriers are too much prejudiced in favour of certain balſams, ointments, and tinctures; and too ſanguine in the belief of their ſuppoſed ſpecific virtues, the healing qualities of which they flatter themſelves are irreſiſtible. But the truth is, all that art can do in the healing of wounds, is to remove every impediment which may obſtruct the uniting of the divided parts, and to forward the formation of laudable pus or matter; that being once effected, the reſt is performed by nature, which is ſelf-ſufficient. All the balſams and remedies which are ſaid to generate new fleſh, in fact only aſſiſt nature by excluding the external air, keeping the wounded parts warm, and confining the ſecreted humours, which, by remaining there a due time, are converted into laudable matter, which is the balſam of nature's preparing. Therefore, the moſt approved and rational method of treating recent wounds is, to endeavour to bring them to a ſuppuration or diſcharge of laudable matter; for which purpoſe, poultices are moſt eligible, as they may be eaſily made more or leſs of a digeſtive quality, by melting and mixing any proper digeſtive ointment with the poultice whilſt warm.

Digeſtive ointment. TAKE common turpentine and hog's lard, of each equal parts, melted together.

This ointment may be made ſtronger or weaker, by diminiſhing the one ingredient and increaſing the other; and is very proper to be mixed with poultices, in order to keep them ſoft and pliable.

Digeſtive Poultice. TAKE oat-meal or coarſe wheat-flour; digeſtive ointment, two ounces; beer-grounds, a ſufficient quantity: boil the whole to the conſiſtence of a poultice. The quantity of the ointment may be increaſed or diminiſhed in proportion to the ſize of the poultice.

The experience the author has had of the good effects of poultices of this kind in recent wounds, makes him recommend them as preferable to any other mode of dreſſing, for promoting a quick ſuppuration, and leaving a ſmooth even cicatrix.

3. *Emollient Poultice.* TAKE oat-meal, or coarſe flour, and linſeed powdered, of each half a pound. Boil them in milk or water to the conſiſtence of a poultice: to which add of ſal ammoniac, in powder, one ounce.

This emollient poultice may be applied when there is a great heat, inflammation, or ſwelling, attending wounds; and by the addition of freſh butter, lard, or oil, may be made of a more relaxing nature.

Many people are indeed prejudiced againſt the uſe of poultices, from a wrong notion, that they (as the phraſe is) draw humours to the wounded part; but the abſurdity of this way of reaſoning will be evident to thoſe who are acquainted with the healing art.

"Poultices (ſays Mr Bartlett) are of ſuch real and extenſive uſe in farriery, that we thought the compoſition of them could not be too general. How ſimple ſoever the ingredients may appear to ſome (which are generally at hand), yet they will be found to anſwer moſt

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moſt intentions, where preſent eaſe is to be obtained by warmth, ſoftening, and relaxing the injured part. Many are the caſes which demand ſuch aſſiſtance, as recent ſwellings, inflammations, treads, bruiſes, cracked and ſwelled heels and feet, burns, ſcalds, bruiſed and lacerated wounds from ſtumps, thorns, glaſs, nails, &c. which laſt are much better treated with ſuch ſimple emollient applications, than by hot oils or ſcalding plaſters dropt into the wounds; which, under the abſurd notion of drawing, but too often ſear up the mouths of the veſſels, hinder digeſtion, and conſequently increaſe both pain and inflammation. In ſhort, it is certain that very great ſervices are daily done by the uſe of poultices, not only in thoſe diſorders to which the human body is incident, but alſo in thoſe wherewith the brute part of the creation is afflicted. One advantage which they have over moſt outward applications is peculiar to them, that they convey and retain an additional heat, beſides what is often in the ingredients; and as moſt of them have alſo ſomething emollient in their compoſition, they muſt neceſſarily ſoften and relax the ſkin and veſſels, abate tenſion, attenuate and thin viſcid and obſtructed juices, ſo that their return into the common courſe of circulation, or diſcharge by the pores of the ſkin, muſt in general be much better anſwered by poultices than by other methods."

Poultices may be continued till ſuch time as the wound appears to be well digeſted (that is, a kindly ſuppuration of white well-concocted matter), look ſmooth and equal, free from cavities or excreſcences of proud fleſh; in that caſe, the uſe of poultices may be left off, and the ſurface of the wound may be ſprinkled over with the following mild eſcharotic powder.

TAKE burnt limeſtone, that breaks down on being expoſed to the air without water, three ounces; Armenian bole, one ounce; rubbed together in a mortar, and put through a fine ſieve.

After the wound is ſprinkled with this powder, a pledget of dry lint may be fixed gently over it; and, when the ſurface of the wound is nearly equal with the ſkin, the powder will be ſufficient, without any cloth or covering.

3. There is another ſpecies of wounds to which the feet are much expoſed, called *punctures*, on account of their ſmall orifice, as the parts immediately after the wound is inflicted readily cloſe up, whereby it becomes difficult to know the depth of the wound. They are generally occaſioned from treading upon ſharp ſtones, broken glaſs, ſharp bones, and nails, and likewiſe from nails in ſhoeing; either of theſe perforating the ſole or frog, and wounding the internal parts of the foot; which, from their ſituation and confinement within the hoof, are attended with the moſt violent pain and inflammation, which are frequently increaſed by the injudicious method generally obſerved in treating theſe wounds when firſt inflicted, by the application of hot corroſive oils poured into the recent wound, in order to deaden it, which is productive of the worſt of conſequences. Thus, a fine young chaiſe-horſe, upon a journey, was pricked with a nail in ſhoeing; which being immediately obſerved, the farrier poured into the wound oil of vitriol. The horſe continued very lame; and, upon the third day, he gave up, not being able to travel any longer. The leg, immediately above the hoof, ſwelled to a moſt enormous ſize, broke out in different places, and diſcharged an incredible quantity of bloody matter, by which the whole limb was waſted, and the horſe rendered entirely uſeleſs.

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Punctures or pricks from nails in ſhoeing, are commonly ſaid to proceed from ignorance or blundering. This may ſometimes be the caſe; but, at the ſame time, it is an accident that may, and indeed does, happen to the moſt expert artiſt; and it is ſurpriſing, conſidering the narrow ſpace there is in ſome hoofs for driving nails, that it does not happen more frequently. When it is diſcovered in time, it is eaſily cured, by opening a paſſage for the matter downwards, and dreſſing it with any digeſtive ointment or poultice, and keeping the foot moiſt, by applying an emollient poultice all round the hoof. But when it is overlooked, or a fragment of the nail remains in the wound, the inflammation increaſing, it at laſt ſuppurates. The matter accumulating, and not finding a paſſage downwards, from the natural formation of the hoof, it moves upwards to the coronet or top of the hoof, and forms a round tumour, which afterwards breaks out and degenerates into a moſt malignant ulcer, commonly termed,

4. A *Quittor-bone*. This tumor is attended with great pain and inflammation, and a conſiderable ſwelling round its baſis. The method of cure commonly practiſed, and indeed recommended by authors, eſpecially Dr Braken, is to bore a number of holes into the ſubſtance of the tumor with a hot iron, pointed pyramidally; and to introduce into theſe holes ſmall pieces of corroſive ſublimate (ſome even uſe arſenick), which corrodes and deſtroys the fleſh for ſome ſpace around them, and at laſt ſeparates from the ſound parts, in a hardened maſs of dead mortified fleſh, called a *core*, which falls off and leaves a large ſurface of a wound. But, frequently, a ſecond or ſometimes a third operation is found neceſſary, before the fiſtula or ſinus can be opened to the bottom, and the proud fleſh totally overcome, which grows very luxuriantly, and renders the cure tedious, uncertain, and very painful to the animal. Therefore, as this method of cure is attended with ſo many inconveniences, and is even dangerous from the quantity of ſublimate, &c. made uſe of, which may as readily deſtroy the ligament of the joint, bones, &c. as the ſubſtance of the tumor, it ought never to be uſed but with caution, and when other means have failed, as it likewiſe endangers the life of the horſe. The knife ſeems far preferable: firſt tie a ligature round the fetlock, in order to ſtop the bleeding; and, with a crooked ſharp knife, cut out the tumor to the bottom; afterwards dreſs it like a freſh wound till it is healed up.

In ulcers of this kind, as there are a number of ſinuſes or fiſtulæ which run in different directions underneath the hoof, it is hardly poſſible to avoid deſtroying the annular ligament which lies below the coronet, and cutting away a large portion of the hoof; yet, in many caſes (eſpecially when there is an opening in the tumor), the method propoſed, at the beginning of this ſection, for curing the deep wounds upon the coronet with ſeton, may be firſt tried; and, if that does not ſucceed, either of the operations above mentioned may be performed.

Punctures differ little or nothing, in the manner of

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treating them, from wounds; only the ſole or frog ſhould be ſcraped thin all round the orifice of the wound, which, at the ſame time, if too ſmall, ſhould be enlarged, and the digeſtive poultice applied, taking care that no fragment or extraneous ſubſtance remain in the wound, and keeping the whole hoof moiſt and ſoft with emollient poultices around it; and, in caſes attended with violent pain, recourſe muſt be had to ſuch internal remedies as are proper in inflammatory caſes, ſuch as the following mixture by way of a drink, in order to prevent, as much as poſſible, an inflammation, or a flux of humours to the afflicted limb, bleeding being firſt premiſed, together with uſing a low ſoft diet.

Take ſalt of nitre, two ounces; common treacle, two ounces. Diſſolve in a quart of water.

It will be neceſſary to repeat this draught morning and evening; if the horſe ſhould ſhow any uneaſineſs, or appear griped, the quantity of water may be increaſed, or the ſame quantity of nitre may be given the horſe in a maſh of bran twice a-day, if it does not cauſe him loath his food. If the coffin-bone ſhould be wounded and turns carious, it will be tedious to wait for an exfoliation, as, from the ſpongy texture of this bone, it exfoliates but ſlowly: therefore, if it can conveniently be done, the carious parts may be ſcraped off with a knife, and afterwards dreſſed with pledgets of tow dipped in the tincture of myrrh; and let the poultice be applied above it.

In punctures, as above deſcribed, it is a common practice to pour into the wound hot corroſive oils (ſome even run into the wound an iron nail made red hot), in order, as the phraſe is, to deaden the parts. In ſuperficial or ſlight wounds, when perhaps little more than the hoof is wounded, the application of hot oils can hardly be very hurtful: but the barbarous method of puſhing a hot nail into a recent wound, cannot fail of being attended with bad conſequences, as the cure is unqueſtionably worſe than the diſeaſe. But, at all events, when the puncture is deep, either of theſe cruel methods is extremely hurtful. The wound is ſaid to be of the moſt inveterate or deſperate kind; when, in fact, the bad practice of injudicious applications, &c. eſcape the juſt cenſure they deſerve.

5. *Contuſions* or *bruiſes* happen frequently on the coronet or top of the hoof, from the treading of other horſes feet, which will occaſion lameneſs; although, at the ſame time, no external mark of violence will appear on the coronet farther than a little ſwelling, or the horſe will ſhow a ſenſe of pain when the affected part is touched or preſſed upon. The following poultice in this caſe may be applied with ſucceſs, if continued for ſome time.

Take thick lees of wine or vinegar, one pint; crude ſal ammoniac, two ounces; oat-meal or bran, ſufficient to make it of a due conſiſtence. Diſſolve the ſal ammoniac in the lees firſt.

Before concluding this ſection, it may not be improper to mention the following rules, which ought carefully to be attended to by every practitioner. 1. The firſt thing to be obſerved in dreſſing of wounds is, to remove all foreign bodies (if it can be done with ſafety), all lacerated or torn parts, whether of the fleſh or of the hoof, &c. which, from their being left in the wound, would greatly impede the cure. 2. All wounds ſhould be carefully inſpected at every dreſſing, obſerving attentively whether any alteration has been made on their ſurface, whether they be clean at the bottom, and free from any extraneous ſubſtance that may hinder or retard the cure. 3. Whatever appears mortified, or any fungous or proud fleſh, muſt be removed, either by ſuppuration, by the knife, or by cauſtic. 4. Cramming wounds with hard tents, or ſyringing them frequently with ſpirituous tinctures, are extremely hurtful. The former increaſes the pain and inflammation, &c. the latter produces a callus upon the internal ſurface of the wounds, which prevents their healing. 5. The dreſſings of wounds ſhould lie ſmooth and eaſy upon the parts. 6. Over-tight ligatures or bandages ſhould be carefully avoided. 7. As wounds in the feet or legs, for obvious reaſons, are more difficult to heal than on any other part of the body; therefore, reſt and a wide ſtall are abſolutely neceſſary, together with a low regimen or ſoft diet, in order to keep the body cool and open.

Foundered.

Sect. XLI. *Of that Diſeaſe in the Feet commonly called* Foundered.

The term *foundered* is frequently applied to lame horſes in a very vague manner, and without any determined or fixed meaning: for, when a horſe ſhows any defect or impediment in moving his fore-feet, he is then pronounced to be foundered, whether he really has been ſo or not; that is, according to what is commonly underſtood by that term, owing to the want or neglect of not making proper diſtinctions of the different diſeaſes in the feet. If we conſult authors who have treated upon this ſubject, we ſhall find their accounts of it very dark and imperfect; they bewilder the reader, and convey but a very indiſtinct idea of the nature of the diſeaſe: hence many errors are committed in practice, to the deſtruction of a number of valuable horſes, which otherwiſe, by proper management, might have been rendered ſound and uſeful. When a horſe is firſt attacked with this diſorder, he ſhows a great reſtleſſneſs, is hot and feveriſh, heaves much at the flanks, breathes quick, has a quick ſtrong pulſe, and groans much when moved about; at the ſame time, he ſhows ſymptoms of the moſt violent pain, ſometimes in one, but more frequently in both fore-feet; for which reaſon, he lies down much; but, when forced to move forwards, he draws himſelf together, as it were into a heap, by bringing forward his hind-feet almoſt under his ſhoulders, in order to keep the weight of his body as much as poſſible from reſting upon his fore-feet. In ſtepping forward, he ſets his heel down firſt with great caution, as afraid of touching the ground. This laſt ſymptom ſhould be particularly attended to, as from it we may conclude with certainty that the chief ſeat of the diſorder is in the feet. The hoofs at the ſame time are exceedingly hot; and, if water is thrown upon them, they dry inſtantly: if an attempt is made to pull off any of the ſhoes, the horſe ſhows great uneaſineſs upon the leaſt twiſt or preſſure made upon any part of the foot, and a great unwillingneſs to ſupport the weight of his body upon the other foot, eſpecially when they are both alike affected.

It is univerſally allowed, that the cauſe of this diſeaſe proceeds from too violent exerciſe, ſuch as riding

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Foundered. very hard upon ſtony grounds or turnpike roads, and that young horſes are moſt liable to it; and to theſe we may likewiſe add, unequal preſſure upon the internal parts of the foot, from the concave or hollow form of the common ſhoes. All theſe cauſes combined together, when a horſe is of a plethoric or full habit of body, and not accuſtomed to violent exerciſe, occaſion this diſeaſe in a greater or leſs degree. To form ſome faint idea of this malady in horſes, we may in a great meaſure appeal to what we experience ourſelves in running upon hard ground; for we find, that it occaſions a great heat, attended with a ſmart pain in our feet, which would be greatly increaſed from uneaſy ſhoes, eſpecially if compelled (like horſes) to continue the running for any conſiderable time. The feet likewiſe become turgid and painful after a long day's journey, eſpecially if the perſon is not accuſtomed to travel; and this inflammation frequently terminates in bliſters upon the ſoles of the feet. Hence it is evident, that, in proportion to the habit of body the horſe is in at the time, and the violence of the labour or exerciſe he has undergone, the inflammation in the internal parts of the foot will be more or leſs violent, and attended with all the ſymptoms already mentioned.

This diſeaſe, then, appears from the ſymptoms attending it, and the effects it afterwards produces in the feet, to be, in its firſt ſtage, an inflammation of the internal parts of the feet, ariſing from the violent exerciſe, which occaſions a more than ordinary determination of the blood to the feet: hence that rapid circulation of the blood in the veſſels within the hoof, which frequently terminates in a rupture of theſe veſſels, and of courſe an extravaſation of the blood, and, in ſome caſes, a total ſeparation of the horny ſubſtance of the hoof from the aponeurotic fibres upon the fore part of the coffin bone; whilſt in others, where it has been leſs violent, a concretion or growing together of the parts within the hoof has taken place, ſo as to appear upon diſſection one ſolid maſs; and hence lameneſs.

Thus, a young chaiſe-horſe, after a hard day's work, was attacked with all the ſymptoms already mentioned, and was treated in the common manner as above related, that is, rowelled, &c. In a few weeks after the diſeaſe had taken its courſe in the ordinary way, he was put under the author's care. The ſole, a little before the point of the frog, in one of his fore-feet, became ſoft; and having a curioſity to ſee the cauſe of it, the author cut away the ſole, which was but thin, and found a cavity containing a reddiſh coloured liquor: after removing the ragged parts of the hoof, a large tranſverſe opening ſhowed itſelf, into which a probe was introduced upwards between the coffin-bone and the hoof; the connection between the tendinous fibres upon the ſurface of the coffin-bone and the hoof was deſtroyed at the fore-part or toe; the bone, loſing part of its ſupport, preſſed down upon the horny ſole, and produced that ſwelling or convexity of its ſurface, which is called a *high, round*, or *pumice ſole*. The hoof loſt its former ſhape, growing narrow towards the toe, with a preternatural thickneſs of the horny ſubſtance of the cruſt, whilſt the quarters or ſides of the hoof were decayed, thin, and full of deep wrinkles, together with a hollowneſs upon the ſurface of the upper part of the hoof, the whole foot having a diſeaſed appearance. When the horſe had recovered ſo far as to be able to walk, in going forward he threw out his legs well before him, but drew them backwards before he ſet his foot to the ground; ſetting the heel down firſt with great caution, upon which he reſted moſt, the toe being turned a little upwards. From this ſymptom only, we may judge with certainty, even though at a diſtance, upon ſeeing a horſe walk, whether he has ever been foundered or not. Foundered.

This diſeaſe proves ſtill more violent, and indeed ſometimes fatal, if the horſe has been allowed to ſtand in cold water when his feet are overheated. Thus, a ſaddle-horſe, after being rode very hard, was turned looſe into a ſtable-yard all over in a ſweat; he went immediately into the water-pond, where he was ſuffered to ſtand for a conſiderable time in very cold weather: a few hours afterwards, he was ſeized with a moſt violent fever, and a great pain in his fore-feet: he lay upon the litter for ſome days in the greateſt agony; and at laſt both his hoofs dropt off, occaſioned by a mortification brought upon the parts from the application of the cold water, which rendered him entirely uſeleſs.

From what has been ſaid with reſpect to this diſeaſe, it is evident, that as the circulation is greatly increaſed, and the current of blood chiefly determined towards the fore-feet, attended with ſymptoms of the moſt violent pain, we may thence conclude, that there is an inflammation in theſe parts: therefore, the cure muſt firſt be attempted by diminiſhing the circulation of the blood, giving cooling ſalts internally, glyſters, an opening diet, and plenty of diluting liquor four or five times a-day, together with emollient poultices applied warm all round the hoofs, in order to ſoften them, and keep up a free and equal perſpiration; obſerving, that his ſhoes be eaſy upon his feet; but by no means to pare the ſole or frog to that exceſs which is commonly done in caſes of this kind, farther than cleaning away the hardened ſurface of the ſole and frog, in order that the poultice may have the deſired effect, by increaſing the perſpiration through the pores; and to avoid all manner of greaſy or oily applications to the hoofs, for the reaſons already mentioned.

In all violent inflammations, there is nothing which contributes more to give immediate relief, than plentiful bleeding timeouſly performed; and which ought by no means to be neglected, or too long delayed: for, in caſes of this nature, although the fever may be ſo far overcome by ſtrength of conſtitution, or prevented by medicines from deſtroying the life of the animal; yet the effects of it will ever afterwards remain, and, of courſe, the horſe will be lame for life. But, in order to judge properly when this operation may be neceſſary, the pulſe muſt be attended to, the knowledge of which is of the utmoſt importance in the practice of farriery, and ſhould be more generally ſtudied, as it is the only criterion or rule by which we may be directed when bleeding is neceſſary, or when it ought to be avoided. But when this operation is neglected, and the cure is firſt attempted by rowels, &c. it is a long time before they can come to a proper ſuppuration, on account of the violence of the fever. Hence, in place of ſuppurating, they ſometimes turn into

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into a gangrene, by which many horſes loſe their lives. But, at all events, before the rowels could have any effect, even allowing they were to ſuppurate in the common time (which is about three days), the inflammation within the hoof will by that time have taken place, and its conſequences will follow, to the ruin of the feet, and, of courſe, the loſs of the horſe.

The manner in which a horſe walks or ſtands upon his fore parts, when affected with this diſorder, has induced many practitioners, &c. to conclude, that the ſhoulders are affected: hence they ſay a horſe is foundered in the body; and that drains, ſuch as rowels, are the only proper remedies. But granting there was a ſtiffneſs, &c. all over the body, which is frequently the caſe in the beginning of inflammatory fevers, bleeding ought to be premiſed, as the firſt neceſſary ſtep towards the cure.

Sect. XLII. *Hoof-Bound.*

This complaint affects the hoofs differently, according to their natural ſhape, and the treatment they are expoſed to, whether from injudicious ſhoeing, keeping the hoofs too hot and dry, or paring the ſole and binders at every time they are ſhoed. Some are affected with a circular contraction of the cruſt, compreſſing the whole foot. In others, the cruſt is contracted at the coronet only, compreſſing the annular ligament, &c. A third kind is, when either one or both heels are contracted: hence, therefore, in proportion to the degree of contraction, the internal parts of the foot are compreſſed, and the horſe becomes more or leſs lame.

It has been already obſerved, Sect. xxxix. that deep-cruſted narrow hoofs, or what are commonly called *aſſes hoofs*, are naturally diſpoſed to this malady: when they become diſeaſed, they are eaſily known from their appearance, as they are ſmaller in proportion than the legs, and frequently ſmaller at their baſis than at the coronet; the cruſt of the heels is high, thick, and ſtrong; the frog waſted and rotten; the hoofs are almoſt perpendicular; the horſe moves in pain, ſteps ſhort and quick, and trips and ſtumbles frequently; it is not uncommon that one foot only is affected, which then appears conſiderably ſmaller than the other.

This diſeaſe is haſtened and brought on by paring and hollowing out the ſole and binders at every time the ſhoes are renewed, from a miſtaken notion of widening the heels: hence they are thereby made ſo very thin, that the cruſt at the extremity of the heels may be forced almoſt cloſe to one another even with one's fingers: and what greatly forwards the complaint, is the form of the ſhoes commonly uſed, which are made hollow; for this practice of hollowing the ſhoes ſo univerſally prevails, that, without any regard to the ſhape of the ſole, whether it be flat or otherwiſe, the ſhoe is made concave or hollow upon that ſide which is placed next the foot. Hence the outer edges of the concave ſhoes force the cruſts at the heels nearer to one another; which being there retained, the contraction of the hoof becomes general, and confirmed beyond the power of art or remedy.

In the ſecond ſpecies of this complaint, the hoof acquires a particular ſhape, which Mr Gibſon, in his Farriery, compares to that of a bell; that is, the hoof appears contracted and tight round the coronet and inſtep, but ſpreads wider downwards to its baſis; the hoof in other reſpects looks well and ſound. This is generally occaſioned by keeping the horſe ſtanding for a long time together in the ſtable upon hot dry litter, without moiſtening and cooling the hoofs, allowing them at the ſame time to grow to a preternatural ſize both in length and breadth: hence, from the great ſtrength, the rigidneſs and dryneſs of the under part of the hoof, a preternatural ſtricture or preſſure is made by the hardened cruſt at the coronet, which compreſſes the annular ligament and parts near it.

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The third ſpecies of this malady is, when either one or both heels are contracted. This frequently happens even in all kinds of hoofs, but more eſpecially in thoſe that are flat, from the uſe of concave or hollow ſhoes, together with cutting out the ſole and binders at every time the horſe is ſhoed. But it more frequently happens, that the inſide heel only is contracted, from the natural weakneſs of that part of the hoof: hence the weight of the limb, &c. preſſing upon the inſide cruſt at the heel, it is inflected or bended inwards; by which, together with the concave form of the ſhoe, and loſs of ſubſtance from paring, &c. the diſorder is increaſed, the cruſt of the heels becomes contracted, and compreſſes that quarter of the foot, and of courſe occaſions lameneſs.

With reſpect to any particular method of cure to be obſerved in removing this diſeaſe, all that can be ſaid is, That, as it is one of that kind which comes on gradually and perceptibly, it may by proper care and management, when properly attended to, be prevented. But when once it becomes confirmed, it never will admit of a thorough cure. Nevertheleſs, it may be ſo far palliated as to render a horſe in ſome degree ſounder, by keeping the hoofs cool and moiſt; as, in this caſe, they are naturally diſpoſed to be very hot, dry, and hard, his ſhoes ſhould be flat, narrow, and open heeled, the hoofs never greaſed nor oiled, the ſoles never pared. But as the cruſts of the heels in theſe hoofs are preternaturally high and ſtrong, they ſhould always be pared down till they are lower than the frog, that it if poſſible may reſt upon the ground. This operation will tend to remove that ſtricture from the heels and frog, which will greatly relieve them. But many people, adhering too ſtrictly to that general rule, which from inattention has creeped into practice, *viz.* of paring down the toes, and keeping the heels entire, without reflecting upon the ſhape or natural formation of the particular hoofs, continue the ſame practice upon deep-cruſted, high-heeled hoofs, which is only neceſſary to be obſerved in long-toed hoofs with low heels, and thereby this diſorder is greatly increaſed; the weight of the body is likewiſe thrown forwards, by which the horſe ſtands too much upon his toes; and hence the leg-bones, from the aukward habit of the horſe's ſtanding, become bent at the joints, and occaſion what is called *knuckeling* or *nuckeling*.

The ſecond ſpecies of this complaint, is when the cruſt at the coronet becomes contracted; and compreſſing the annular ligament, &c. occaſions lameneſs, the hoof acquiring that ſhape formerly compared to that of a bell. Different methods have been tried and recommended for the cure. Mr Gibſon propoſes to make ſeveral lines or raſes on the fore-part of the hoof with a drawing knife, almoſt to the quick, from the coronet

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down to its baſis, and turning the horſe out to graſs: others, after this operation is performed, ſcrew the heels wide, by means of a ſcrewed ſhoe: a third method practiſed is, to draw the ſole, and divide the fleſhy ſubſtance of the frog with a knife, and keeping it ſeparated by the ſcrewed ſhoe above mentioned: a fourth method in uſe, is to make the inner-rim of the ſhoe-heel very thick on the under ſide (its upper ſurface being quite flat); and by making it reſt upon the binders and ſole at the extremity of the heels, by preſſure from the weight of the body, the heels are forced to recede to a greater diſtance from one another. Either of theſe methods may indeed in a ſmall degree widen or expand the horny ſubſtance of the cruſt, and may be of uſe in recent contractions. But when once it has become confirmed, and is of ſome ſtanding, no means whatever can then reſtore the internal parts to their primitive ſtate; for as the contraction takes place, the tender parts within the hoof being compreſſed, loſe their tone, and diminiſh in their ſize. The blood-veſſels become impervious; hence a decay or waſting of the whole foot, and not unfrequently a concretion of the parts, and of courſe the impoſſibiltiy of the horſe ever becoming ſound. But as it has been obſerved, that the cauſe of this ſpecies of the complaint now under conſideration proceeds from allowing the hoofs to grow to an extraordinary ſize, and keeping them too hot and dry, by which they acquire a rigidity and dryneſs, occaſioning a preternatural compreſſion upon the coronet; to remove which (as the caſe will only admit of palliation), the ſurface of the hoof at its baſis muſt be pared down till the blood appears, the thick ſtrong cruſt upon the outſide towards the toe raſped in the ſame manner, and the horſe turned out to graſs in ſoft meadow-ground till the feet recover. But it muſt be obſerved, that if both hoofs are alike affected, one of them at one time only ſhould be treated in the manner directed, as a tenderneſs will remain for ſome days, which might prevent the horſe from walking about in ſearch of food.

The third ſpecies is a contraction of one, or ſometimes of both heels, in flat feet, from the uſe of concave ſhoes, &c. Where it has not been of a very long ſtanding, it may, by proper management, be greatly relieved, by laying aſide the uſe of concave ſhoes, and refraining from paring the ſole, &c. But to remove the ſtricture of the hoof more immediately, the whole contracted quarter of the cruſt near the heel muſt be raſped or pared to the quick, from the coronet to its baſis, cloſe to the frog, taking care to avoid drawing blood, putting on a barred ſhoe, cauſing the ſhoe-bar to preſs upon the frog, keeping the hoof cool and moiſt, or turning the horſe out to graſs. Hence the preſſure from the contracted hoof being removed, and the frog at the ſame time reſting upon the bar of the ſhoe, the contracted quarter is thereby dilated or expanded: the new hoof growing from the coronet downwards, acquires a round, full ſhape, and becomes of its original form.

From what has been ſaid concerning this diſorder in the feet of horſes, it is evident, what little proſpect there is of effecting a thorough cure by art, as the complaint is of ſuch a nature as only to admit of ſome palliation, and even then in ſome very favourable caſes only. Nevertheleſs, it is practicable to prevent contractions in the hoofs from taking place, even in thoſe hoofs which are ſeemingly-diſpoſed that way from their ſhape, &c. by obſerving the rules already laid down, viz. by keeping the hoofs moiſt and cool, which is their natural ſtate; uſing flat ſhoes, from which the hoofs can acquire no bad ſhape; allowing the ſole and frog to continue in their full ſtrength, the latter eſpecially to reſt upon the ground; and keeping the cruſt within due bounds, not ſuffering it to grow too long towards the toe, nor too high at the heels.

Corns.

Sect. XLIII. *Of Corns.*

In the human body, corns in the feet are termed ſo with ſome propriety, from their horny ſubſtance; but what are called *corns* in the feet of horſes, are very improperly named, as they are quite of an oppoſite nature, rather reſembling contuſions or bruiſes, and not unlike thoſe bruiſes which happen in the palms of the hands and fingers to working people, ariſing from violent pinching, bruiſing, &c. where the ſkin is thick, which appears of a blackiſh red colour, and exceedingly painful at firſt, containing blood; but in the end, the ſerum or thinner parts being abſorbed, the red particles appear when the dead ſkin is removed, like red powder. In like manner corns, or rather bruiſes, appear red and *foxy*, as the phraſe is. They are ſituated in the corner or ſharp angle of the ſole at the extremity of the heels, where the cruſt reflects inward and forward, forming the binders. But they are more frequently to be met with in the inſide heel, from the manner of the horſe's ſtanding, together with the preſſure or weight of the body, which is greater upon the inſide of the hoof than the outſide. Bruiſes of this kind are exceedingly painful, inſomuch that the horſe ſhrinks and ſtumbles when any thing touches or preſſes upon that quarter of the hoof; hence lameneſs.

This complaint ariſes from different cauſes, according to the ſhape or natural formation of the hoof, together with the treatment they are expoſed to. But the following are the moſt frequent.

1ſt, In flat low heels, from too great a preſſure of the ſhoe-heel upon the ſole, whether from caukers, a too great thickneſs of iron upon the heels of the ſhoe, or its being bended downwards upon the ſole, or the ſhoe made too concave; either of theſe cauſes will produce the ſame effect: for, from the too great preſſure upon the horny ſole, the fleſhy ſole, which lies immediately underneath it, is compreſſed and bruiſed between the ſhoe-heel, the ſole, and the extremities or outward points of the coffin-bone; and hence a contuſion or bruiſe, attended with an extravaſation of the blood, which afterwards gives that part of the ſole a red appearance, and is the reaſon why the ſole on that place never grows up ſo firm and ſolid as it was before, but remains ſoft and ſpongy, forming a lodgement for ſand and gravel, which frequently inſinuates itſelf into the quick, cauſing an inflammation, attended with a ſuppuration or diſcharge of matter, which, if not finding a paſſage below, will break out at the coronet.

2d, This complaint is produced in wide open heels, when the hoofs are very thick and ſtrong, from too great a luxuriancy of the binder, which, being inflected or bended downwards between the ſhoe and the

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Corns. sole, compreſſes the fleſhy ſole, as already mentioned; and hence lameneſs.

3*d*, This malady, in deep narrow hoofs, proceeds from a contraction of the cruſt compreſſing the heels, &c. Hence, it not unfrequently happens in hoofs of this ſhape, that both heels are alike affected, from the ſtricture and preſſure of the hardened cruſt upon the tendinous aponeuroſis, &c. on the outſide of the coffin-bone, which in this caſe is bruiſed between the bone and the cruſt; hence the redneſs may ſometimes be traced upwards almoſt to the coronet. In this caſe no radical cure can take place, as the cauſe which produces theſe bruiſes, &c. will exiſt while the horſe lives, and at the ſame time the horſe will be lame from the contraction of the hoof; but the remedy propoſed in the preceding ſection, by way of palliation for hoof-bound feet, may be of uſe to render the horſe in ſome meaſure more ſerviceable.

With reſpect to the two firſt cauſes, when the bruiſe proceeds from too great a preſſure from the ſhoe-heels, &c. upon the ſole, the ſhoe muſt be made ſo as to bear off the tender part, and likewiſe to ſome diſtance on both ſides of it; for which purpoſe, a round or a barred ſhoe will be neceſſary. The red and bruiſed parts muſt be cut out to the quick, and the hoof kept ſoft with emollient poultices for ſome time. But the texture of the blood-veſſels, and likewiſe that of the hoof at the bruiſed part, being deſtroyed, a ſpongineſs remains afterwards, and upon the leaſt unequal preſſure from the ſhoe, &c. are liable to a relapſe, never admitting of a thorough cure, and of conſequence ſubject to frequent lameneſs.

Corns or bruiſes in the feet of horſes might, by taking proper care of them, be eaſily avoided: for in thoſe countries where horſes go moſtly barefooted, this malady is not ſo much as known; neither are thoſe horſes that go conſtantly at cart and plough ſubject to them: hence, therefore, this complaint is moſt frequently to be met with in great towns, where horſes go much upon hard cauſeway, having their ſhoes turned up with high caukers on the heels, and frequently renewed, at the ſame time their hoofs being kept too dry and hard, from ſtanding too much upon hot dry litter: hence will appear the neceſſity of complying with what is moſt natural to the hoofs of horſes, namely, coolneſs and moiſture, together with uſing ſuch a form of ſhoe as will preſs equally upon the circumference of the cruſt, and without giving it any bad unnatural ſhape. See ſect. xlvii.

Sect. XLIV. *Of Running Thruſhes.*

1. A Running Thrush (or Frush), is a diſcharge of a fetid, and ſometimes ichorous, matter, from the cleft in the middle of the frog, affecting one, frequently both, and in ſome caſes all the four feet. But, generally, the fore-feet are moſt ſubject to this diſeaſe. In moſt caſes, it ſeldom admits of a radical cure; but is ſubject to frequent relapſes, occaſioning lameneſs, from the rawneſs and tenderneſs of the parts affected, on being expoſed to ſand, gravel, &c. or in rough ground, from the heels trading on ſharp ſtones, &c. and when the horſe happens to be of a bad habit of body, they even degenerate into what is commonly called a *canker*.

Running thruſhes, according to Mr Gibſon, "are ſometimes profitable to horſes of fleſhy and foul conſtitutions; becauſe (ſays he) they drain off a great many bad humours." But however ſalutary or beneficial they may be in ſome particular conſtitutions, yet, upon the whole, they prove extremely troubleſome, on account of the lameneſs and tenderneſs of the feet affected with them; and, where there occurs one caſe in which they may properly be ſaid to become beneficial to the conſtitution, there are a far greater number in which they are hurtful, as they are brought on by the treatment the hoofs are expoſed to, together with the injudicious method generally obſerved in ſhoeing them, particularly in thoſe hoofs that are narrow-heeled, or diſpoſed to be hoof-bound, running thruſhes being always an attendant upon that complaint. But, to explain this more particularly, there is, in the middle of the frog, a cleft or opening, by which the heels in a natural ſtate have a ſmall degree of contraction and expanſion, eſpecially when the horſe treads or preſſes his heel upon the ground, the frog then expands; when, therefore, a horſe is ſhoed with concave or hollow ſhoes, the heels are deprived of that power of expanſion, being conſtantly confined in a contracted ſtate by the reſiſtance from the outer edges of the concave ſhoe, by which the frog is preſſed or ſqueezed on both ſides, by the cruſt of the heels being brought nearer to or almoſt into contact with one another. Hence pain, inflammation, an obſtruction of the blood, &c. (in the fleſhy ſubſtance of the frog), and of courſe that waſting and rottenneſs of its external covering, which, falling off in pieces, leaves the quick almoſt bare: the new frog, growing in detached pieces, never acquires the ſolidity of the former; and hence that rawneſs and tenderneſs which ever afterwards remain, and that extreme ſenſiblity of pain when any hard ſubſtance touches that part of the foot, and of courſe ſubject the horſe to frequent lameneſs. There are, no doubt, other cauſes which may be ſaid to occaſion this malady, even in thoſe hoofs that are wide and open at the heels, where there is not the leaſt appearance of a contraction at the heels: but theſe are generally owing to the treatment the hoofs are expoſed to in the ſtable, by keeping them too hot and dry for a long tract of time together, during which the natural perſpiration is greatly obſtructed, by the conſtant application of greaſe or oil to the hardened hoofs, and ſtuffing them up with hot, reſinous, and greaſy mixtures, as tar, turpentine, &c. the horſe being all the while kept at full feeding, and not having proper and neceſſary exerciſe to promote the circulation of the fluids, and to forward the ordinary ſecretions, &c.: the legs ſwell and inflame; at laſt a running in the frog appears; and hence this diſcharge is ſaid to be beneficial to the conſtitution, when in fact it is but too frequently brought on by a ſlothful neglect, and kept up by bad management. Freſh air and regular exerciſe are eſſentially neceſſary towards preſerving horſes in an active healthy ſtate; for running thruſhes, like other diſeaſes to which pampered horſes are ſubject, are not known in thoſe countries where horſes run at large in the fields; neither are they ſo frequently to be met with in the country amongſt labouring horſes, whoſe exerciſe is regular, and whoſe hoofs are much expoſed to coolneſs and moiſture, the natural ſtate of the feet of horſes.

Running Thruſhes.

With reſpect to the cure of running thruſhes, it has

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Running Thrushes.

been hinted, that in most cases, especially where it has been of long standing, affecting all the frogs more or less, it is impracticable to eradicate it by any assistance from art. For instance, when it proceeds from contracted narrow heels in those feet which are said to be hoof-bound, it is then an attendant only on that disease; and therefore cannot be cured without removing the first cause, though then it will only admit of some small degree of palliation *. But in those hoofs which are wide and open at the heels, where the complaint is recent, one or both the fore-feet only being affected, and where there is reason to suspect that it proceeds from the use of concave or hollow shoes, or keeping the hoofs too hot, dry, and hard, the cure then may be completed with ease and safety, by laying aside the use of concave shoes, washing the frogs clean after exercise, and dressing them with Mel Egyptiacum, made as follows.

* See sect. xlii.

Mel Egyptiacum. Verdegris in fine powder, two ounces; honey six ounces; vinegar four ounces; boil them over a gentle fire till they have acquired a reddish colour.

Or a solution of blue vitriol.

Solution of vitriol. Blue vitriol powdered, one ounce; water, one quart:

keeping the hoofs cool and moist. But, at the same time, recourse must be had to internal remedies by way of revulsion, as purging or diuretic medicines, bleeding being first premised: if the former is made choice of, twice or thrice will be sufficient, repeated at proper intervals; but if the latter, which seems preferable, they may be continued for some time with great safety, without losing one day's work of the horse.

In some cases, there is frequently not only a discharge of fetid matter from the clefts of the frogs; but, at the same time, a discharge of greasy-like matter from the round protuberances of the heels, and the hollow of the pastern joints. It will be necessary, therefore, to make a distinction between the matter discharged in this case, which appears of a thick, white, clammy, or soapy consistence, and that running in the legs commonly termed a *grease*, which is of a quite opposite quality; the latter by good management will admit of a thorough cure, whilst the former baffles all the power of medicine.

2. In horses of a gross habit of body, especially the heavy draught-kind, running thrushes sometimes degenerate into what is commonly called a *canker*. In this case, the horny substance of the frog is soon thrown off; the fleshy parts grow to an immoderate size, the luxuriant substance or spongy flesh having a great number of papillæ or tubercles, which Mr Gibson compares not improperly to cauliflower, the colour only excepted, which is of a pale red, and sometimes variegated and tinged with blood; attended with a copious discharge of a thin ichorous fetid humour, having a most offensive smell. If its progress be not speedily stopt, the fleshy sole, from its vicinity, becomes likewise affected; the horny sole rots, decays, and falls off: the whole foot turns into a kind of quag or bog (in warm weather full of maggots, which it is almost impossible to prevent, even with the most corrosive dressings); the tendons become likewise affected, the bones carious, the hoof falls off, and the horse is rendered useless. To prevent these and the like consequences, as soon as a running thrush begins to show the least malignant disposition, proper means must be used to correct the habit of body, and to divert this discharge to some other outlet, either by purging or diuretic remedies, continued for some time, bleeding being first premised. As to external applications, the first thing necessary to be done, is to pare down the crust till it is lower than the fungus, or growth of the canker, and to remove any hard pieces of the hoof or sole wherever it presses upon the tender parts; the circular part of the crust should be surrounded and kept soft with an emollient poultice. For dressings, the mildest escharotic powders may be first tried, as the following:

False-quarter and Sand-cracks.

TAKE burnt alum powdered two ounces; blue vitriol powdered one ounce.

But when it degenerates into the last species mentioned above, affecting the fleshy sole, &c. the strongest corrosive applications will then be necessary, and sometimes hardly sufficient to keep down the luxuriancy of the fungus. The caustic oils are found preferable, as ol. vitriol. aquafortis, butter of antimony: either of these may be applied once every day; otherwise, if neglected dressing too long, or to every other day, which is the common practice, the great humidity and moisture issuing from the fungus so weakens the force of the strongest oils, that they have little or no effect: when these sharp dressings seem to gain upon the canker, it may be dressed with equal parts of red precipitate and burnt alum pounded and mixed together, till such time as the new sole begins to grow; the purging or diuretic medicines being given at proper intervals till the cure is completed.

SECT. XLV. *Of False-quarter, and Sand-cracks.*

1. What is commonly called a *false-quarter* in the foot of an horse is a cleft or chink in the side or quarter of the hoof, running in a slanting direction with the horny fibres of the hoof, from the coronet to its basis, by which the horny substance of the crust is divided; one part of the hoof being in a manner detached from the other, and rendered unable to sustain its portion or share of the weight of the limb, &c. and hence the name of *false-quarter*: for, when the horse sets his foot on the ground, the chink widens; but, when it is lifted up, the hardened edges of the divided hoof take in between them the tender and soft parts, and squeeze them so as to occasion frequent bleeding at the chink, and is frequently attended with inflammation, a discharge of matter, and of course lameness.

This complaint, notwithstanding the different accounts commonly given as to the cause of it, is in fact the effect of a deep wound or bruise upon the coronet, by which the continuity of the parts has been entirely broke off; for we always find, that when the horny fibres are divided at their roots, they never unite or grow up as before, but leave a blemish, more or less, in proportion to the size and deepness of such wounds, &c. We have many instances of this, even in the human body; for when a wound happens at the roots of the nails, whether in the fingers or toes, it occasions a blemish, which continues to grow in the same manner afterwards. Hence it will be evident, that no radical cure can possibly take place; but we may so far palliate the complaint as to render the horse something useful, by using a shoe of such a construc-

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False-quarter and Sand cracks

tion as will ſupport the weight of the limb, &c. without reſting or preſſing too much upon the weakened quarter; for which purpoſe, a round, or what is called a *barred ſhoe*, will be moſt proper. The ſurface of the hoof on and near the diſeaſed part may be cut down lower than the ſurface of the cruſt upon which the ſhoe is to reſt; or, if the hoof will not admit of being cut down, the ſhoe may be raiſed up from the weak quarter. Either of theſe means will remove the weight of the body from the diſeaſed part, and the horſe will go ſounder.

But as ſand and gravel is eaſily admitted into the chink or crack, where, being accumulated and pent up, it irritates and inflames the parts, whereby matter is formed underneath the hoof, which cauſes lameneſs, and which not unfrequently breaks out at the coronet, producing the moſt inveterate ulcers, which become extremely difficult to heal, on account of the ſinus or fiſtula branching out in different directions underneath the hoof: therefore, horſes with this defect ſhould be carefully obſerved; and, when the thick hardened edges of the chink or crack grow too high, by which it is ſo much the deeper, and, of courſe, lodges the greater quantity of ſand, &c. theſe edges ſhould be raſped, or pared with a crooked knife, till the ſeam diſappears. But wherever there remains a blackneſs, or appearance of gravel, that part muſt be tracked farther; always obſerving, if poſſible, to avoid drawing of blood. The chink or crack thus made ſmooth and equal, no ſand or gravel can lodge in it; and as the parts will be tender, it will be neceſſary to apply an emollient poultice for ſome days, till the tenderneſs wear off. If the inflammation has been great, and matter formed in the crack, or the parts wounded by the knife in cutting its hardened edges, proud fleſh may riſe and jet out. In this caſe, the hard parts of the hoof near it are to be removed, a digeſtive poultice applied; and when the inflammation is abated, the proud fleſh may be touched with the following corroſive powder:

TAKE blue vitriol burnt, two drams; corroſive ſublimate, one dram; rubbed into powder.

2. A *ſand-crack* is of much the ſame nature with a falſe-quarter; only they run more frequently in an horizontal direction than the latter, on the outſide or ſurface of the cruſt: they are generally the effect of ſlight or ſuperficial wounds upon the coronet, and grow gradually downwards towards the baſis of the hoof, and at laſt are cut or raſped off in the ſhoeing; when they occaſion lameneſs from lodging ſand or gravel, they muſt be treated in the ſame manner as already mentioned for *Falſe-quarters*.

SECT. XLVI. *Of Horſes cutting their Legs in Travelling.*

HORSES frequently cut their legs both before and behind, by ſtriking or knocking the hoof when trotting, &c. againſt the oppoſite leg, whereby a wound is made, which is attended with an inflammation, ſwelling, &c. and of courſe lameneſs. The parts commonly wounded from cutting in the fore-legs, are the prominent and back part of the fetlock joint; and under the knee joint on the inſide of the leg. The former is moſt common: the latter only happens to thoſe horſes who raiſe their feet high in trotting; and, as ſuch horſes generally go faſt, this laſt ſpecies of cutting is diſtinguiſhed by the name of the *ſwift* or *ſpeedy cut*. Cutting.

In the hind-legs, horſes cut themſelves upon the prominent part of the fetlock-joint; and ſometimes, eſpecially thoſe who move their legs too low, cut upon the coronet. But whether they cut before or behind, it commonly proceeds from ſome of the following cauſes.

1ſt, Injudicious ſhoeing; under which may be included, the hoofs being ſuffered to grow too large and broad, the ſhoe projecting over the inſide edge of the hoof, the clenches or rivets of the nails riſing above the ſurface of the cruſt.

There are a great variety of ſhoes recommended for preventing this complaint, of different conſtructions; but the moſt common are thoſe that are made thick upon the inſide heel. Others have a border or margin turned up upon the inſide of the ſhoe's rim, commonly called a *feather*, which raiſes the inſide of the hoof conſiderably higher from the ground than the outſide. Either of theſe ſhoes may be of uſe to a dealer, in order to make a wry-footed horſe appear to ſtand ſtraight upon his limbs; but can have no effect upon a horſe's manner of moving his legs, eſpecially at the time when the foot is raiſed from the ground, and paſſing by the other leg, ſo as to prevent him from cutting. The reaſon why this method of ſhoeing ſeems to ſucceed, eſpecially in the hind-feet, is this: when the ſhoe is made thick upon the inſide heel, which part commonly ſtrikes the oppoſite leg, the ſhoe-nails are removed to a conſiderable diſtance forward from the thick part of the ſhoe, which, at the ſame time, is kept much within the circle of the hoof; and, on that account, it becomes impoſſible that the ſhoe ſhould touch the oppoſite leg. But, to ſhow that this raiſing of the inſide quarter or heel, by a thickneſs of iron in the ſhoe, is not neceſſary to prevent horſes from cutting, the author has frequently cauſed the heel of the ſhoe to be made thinner than common; and, by keeping it within the hoof, it anſwered equally well with the former: he has likewiſe cauſed the ſhoe to be cut in the middle of the quarter, whereby the hoof at the heel was left quite bare; which anſwered the purpoſe ſo much the better, as the foot was the leſs loaded with the additional weight of ſuperfluous iron.

2d, The great weight of the concave ſhoes commonly uſed, is likewiſe another cauſe why horſes, that in other reſpects move well upon their legs, do frequently cut and wound themſelves; and to this we may add, the great length of the hoof at the toe, eſpecially in the fore-feet, which is allowed frequently to grow to an unnatural ſize. It has been already obſerved, that a great load of iron is by no means neceſſary in a horſe's ſhoe: on the contrary, it becomes a great diſadvantage; for a flat one that is properly conſtructed, and well wrought, that is, well hammered, will wear as long as a concave or hollow ſhoe that is almoſt double the weight of the former. This, at firſt view, will perhaps appear a paradox; but, nevertheleſs, it is a fact: for as the round or outward ſurface of a concave ſhoe is the only part that touches the ground, and is liable to be worn, it ſoon grows thin, and yields to the preſſure from the weight of the body; and therefore

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Cutting. fore muſt be renewed before the other parts of it are hardly touched, and but little reduced in its original weight. But the ſurface of a flat ſhoe, reſting equally upon the ground, will remain firm upon the hoof, and be ſufficiently ſtrong to ſupport the weight of the body till it wears very thin.

When horſes cut or wound themſelves immediately under the knee-joint, this is called the *ſwift* or *ſpeedy cut*; and is occaſioned by raiſing the feet high in trotting, whereby the inſide toe or quarter of the hoof ſtrikes againſt the oppoſite leg. This is eaſily prevented by making the ſhoe ſtraight, and placing it conſiderably within the hoof at the part where the hoof ſtrikes the other leg, obſerving that no nails are to be put in that part of the ſhoe which is kept ſo much within the hoof, otherwiſe they muſt immediately plunge into the quick.

3*d*, When cutting proceeds from a natural defect, that is, a wrong poſition of the foot upon the leg-bones, whereby the toes are turned too much outward or too much inward; at the ſame time, if the horſe croſſes his legs much in trotting; in this caſe there is no preventing his cutting altogether, though it may be palliated. Such horſes are by no means fit for journey-riding, being generally addicted both to cutting and ſtumbling.

In the *laſt* place, it may proceed from fatigue or weakneſs. This happens frequently, even to thoſe horſes that deal their legs well (as the phraſe is), eſpecially in young horſes; but they ſoon leave it off when they acquire more ſtrength, and are accuſtomed to their work: moſt people muſt have experienced this in themſelves when boys, as they at that age are very ready to knock their ancles with the heel of the oppoſite ſhoe, which cuſtom wears off as they grow ſtrong. Upon the whole, the beſt general rule that can be laid down for preventing horſes from cutting their legs, is to keep their hoofs round and ſhort at the toe, and from growing too large and broad; to obſerve that the ſhoe does not project over the inſide edge of the hoof; that the clenches or rivets of the nails on the outer ſurface of the cruſt are ſmooth; and, above all, that the ſhoe be made light, well worked, and properly proportioned to the ſize of the foot. See the following head.

Sect. XLVII. Shoeing *of* Horses.

Horses are ſhoed in order to defend and preſerve their hoofs. As feet differ, ſo ſhould ſhoes accordingly. "The only ſyſtem of farriers, (Lord Pembroke obſerves), is to ſhoe in general with exceſſive heavy and clumſy ill-ſhaped ſhoes, and very many nails, to the total deſtruction of the foot. The cramps they annex, tend to deſtroy the bullet; and the ſhoes made in the ſhape of a walnut-ſhell prevent the horſe's walking upon the firm baſis which God has given him for that end, and thereby oblige him to ſtumble and fall. They totally pare away alſo and lay bare the inſide of the animal's foot with their deteſtable butteries, and afterwards put on very long ſhoes, whereby the foot is hindered from having any preſſure at all upon the heels, which preſſure otherwiſe might ſtill perchance, notwithſtanding their dreadful cutting, keep the heels properly open, and the foot in good order. The frog ſhould never be cut out; but as it will ſometimes become ragged, it muſt be cleaned every now and then, and the ragged pieces pared off with a knife. In one kind of foot indeed a conſiderable cutting away muſt be allowed of, but not of the frog: we mean, that very high feet muſt be cut down to a proper height; becauſe, if they were not, the frog, though not cut, would ſtill be ſo far above the ground, as not to have any bearing upon it, whereby the great tendon muſt inevitably be damaged, and conſequently the horſe would go lame. Shoeing.

"The weight of ſhoes muſt greatly depend on the quality and hardneſs of the iron. If the iron be very good, it will not bend; and in this caſe the ſhoes cannot poſſibly be made too light: care, however, muſt be taken, that they be of a thickneſs ſo as not to bend; for bending would force out the nails, and ruin the hoof. That part of the ſhoe which is next the horſe's heel, muſt be narrower than any other, (as is ſeen in the draught, Plate CLXXXIX.) that ſtones may be thereby prevented from getting under it, and ſticking there: which otherwiſe would be the caſe; becauſe the iron, when it advances inwardly beyond the bearing of the foot, forms a cavity, wherein ſtones being lodged would remain and, by preſſing againſt the foot, lame the horſe. The part of the ſhoe which the horſe walks upon ſhould be quite flat, and the inſide of it likewiſe; only juſt ſpace enough being left next the foot to put in a picker (which ought to be uſed every time the horſe comes into the ſtable), and alſo to prevent the ſhoe's preſſing upon the ſole. Four nails on each ſide hold better than a greater number, and keep the hoof in a far better ſtate. The toe of the horſe muſt be cut ſhort, and nearly ſquare (the angles only juſt rounded off); nor muſt any nails be driven there: this method prevents much ſtumbling, eſpecially in deſcents; and ſerves, by throwing nouriſhment to the heels, to ſtrengthen them: on them the horſe ſhould in ſome meaſure walk, and the ſhoe be made of a proper length accordingly; by this means, narrow heels are prevented, and many other good effects produced. Many people drive a nail at the toe, but it is an abſurd practice. Leaving room to drive one there cauſes the foot to be of an improper length; and moreover, that part of the hoof is naturally ſo brittle, that even when it is kept well greaſed, the nail there ſeldom ſtays in, but tears out and damages the hoof. That the directions for ſhoeing a proper length may be the more clear and intelligible, we have annexed a draught of a foot ſhoed a proper length ſtanding on a plain ſurface, and with it a draught of the right kind of ſhoe.

"In wet, ſpungy, and ſoft ground, where the foot ſinks in, the preſſure upon the heels is of courſe greater than on hard ground; and ſo indeed it ſhould be upon all accounts. The hinder-feet muſt be treated in the ſame manner as the fore-ones; and the ſhoes the ſame; except in hilly and ſlippery countries, they may not improperly be turned up a little behind; but turning up the fore-ſhoes is of no ſervice, and is certain ruin to the fore-legs, eſpecially to the bullets. In deſcending hills, cramps are apt to throw horſes down, by ſtopping the fore-legs, out of their proper baſis and natural bearing, when the hinder ones are rapidly preſſed; which unavoidably muſt be the caſe, and conſequently cannot but puſh the horſe upon his noſe. With them,

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Shoeing. them on a plain ſurface, a horſe's foot is always thrown forwards on the toe, out of its proper bearing, which is very liable to make the horſe ſtumble. The notion of their utility in going up hills is a falſe one. In aſcending, the toe is the firſt part of the foot which bears on, takes hold of the ground, and whether the horſe draws or carries, conſequently the buſineſs is done before the part where the cramps are comes to the ground. Ice-nails are preferable to any thing to prevent ſlipping, as alſo to help horſes up hill, the moſt forward ones taking hold of the ground early, conſiderably before the heels touch the ground: they muſt be ſo made, as to be, when driven in, ſcarce half an inch above the ſhoe, and alſo have four ſides ending at the top in a point. They are of great ſervice to prevent ſlipping on all kinds of places; and by means of them a horſe is not thrown out of his proper baſis. They muſt be made of very good iron; if they are not, the heads of them will be perpetually breaking off. From the race-horſe to the cart-horſe, the ſame ſyſtem of ſhoeing ſhould be obſerved. The ſize, thickneſs, and weight of them only ſhould differ. The ſhoe of a race-horſe muſt of courſe be lighter than that of a ſaddle-horſe; that of a ſaddle-horſe lighter than that of a coach or bat horſe; and theſe laſt more ſo than a cart, waggon, or artillery horſe. At preſent all ſhoes in general are too heavy; if the iron is good, ſhoes need not be ſo thick as they are now generally made.—The utmoſt ſeverity ought to be inflicted upon all thoſe who clap ſhoes on hot: this unpardonable lazineſs of farriers in making feet thus fit ſhoes, inſtead of ſhoes fitting feet, dries up the hoof, and utterly deſtroys them. Frequent removals of ſhoes are detrimental, and tear the foot; but ſometimes they are very neceſſary: this is an inconvenience which half-ſhoes are liable to; for the end of the ſhoe, being very ſhort, is apt to work ſoon into the foot, and conſequently muſt then be moved."

In a late treatiſe on this ſubject by Mr Clark of Edinburgh, the common form of ſhoes, and method of ſhoeing, are, with great appearance of reaſon, totally condemned, and a new form and method recommended, which ſeem founded on rational principles, and to have been confirmed by experience.

Common method. "In preparing the foot for the ſhoe, our author obſerves, the frog, the ſole, and the bars or binders, are pared ſo much that the blood frequently appears. The ſhoe by its form (being thick on the inſide of the rim, and thin upon the outſide*), muſt of conſequence be made concave or hollow on that ſide which is placed immediately next the foot, in order to prevent its reſting upon the ſole. The ſhoes are generally of an immoderate weight and length, and every means is uſed to prevent the frog from reſting upon the ground, by making the ſhoe-heels thick, broad, and ſtrong, or raiſing cramps or caukers on them.

* See Plate CLXXXIX.

"From this form of the ſhoe, and from this method of treating the hoof, the frog is raiſed to a conſiderable height above the ground, the heels are deprived of that ſubſtance which was provided by nature to keep the cruſt extended at a proper wideneſs, and the foot is fixed as it were in a mould.

"By the preſſure from the weight of the body, and reſiſtance from the outer edges of the ſhoe, the heels are forced together, and retain that ſhape impreſſed upon them, which it is impoſſible ever afterwards to remove; hence a contraction of the heels, and of courſe lameneſs. But farther.

Shoeing.

"The heels, as has been obſerved, being forced together, the cruſt preſſes upon the proceſſes of the coffin and extremities of the nut-bone: The frog is confined, and raiſed ſo far from the ground, that it cannot have that ſupport upon it which it ought to have: the circulation of the blood is impeded, and a waſting of the frog, and frequently of the whole foot, enſues. Hence proceed all thoſe diſeaſes of the feet, known by the names of *foundered*, *hoof-bound*, *narrow-heels*, *running thruſhes*, *corns*, *high ſoles*, &c.

"I have likewiſe frequently obſerved, from this compreſſion of the internal parts of the foot, a ſwelling of the legs immediately above the hoof, attended with great pain and inflammation, with a diſcharge of thin, ichorous, fetid matter: from which ſymptoms, it is often concluded, that the horſe is in a bad habit of body (or what is termed a *greaſe falling down*), and muſt therefore undergo a courſe of medicine, &c.

"The bad effects of this practice are ſtill more obvious upon the external parts of the hoof. The cruſt toward the toe, being the only part of the hoof free from compreſſion, enjoys a free circulation of that fluid neceſſary for its nouriſhment, and grows broader and longer; from which extraordinary length of toe, the horſe ſtumbles in his going, and cuts his legs. The ſmaller particles of ſand inſinuate themſelves between the ſhoe and the heels, which grind them away, and thereby produce lameneſs. All this is entirely owing to the great ſpring the heels of the horſe muſt unavoidably have upon the heels of a ſhoe made in this form.

"This concave ſhoe in time wears thin at the toe, and, yielding to the preſſure made upon it, is forced wider, and of conſequence breaks off all that part of the cruſt on the outſide of the nails. Inſtances of this kind daily occur, inſomuch that there hardly remains cruſt ſufficient to fix a ſhoe upon.

"It is generally thought, that the broader a ſhoe is, and the more it covers the ſole and frog, a horſe will travel the better. But, as has been formerly remarked, the broader a ſhoe is of this form, it muſt be made the more concave; and, of conſequence, the contracting power upon the heels muſt be the greater. It is likewiſe to be obſerved, that, by uſing ſtrong broad-rimmed concave ſhoes in the ſummer-ſeaſon, when the weather is hot and the roads very dry and hard, if a horſe is obliged to ride faſt, the ſhoes, by repeated ſtrokes (or friction) againſt the ground, acquire a great degree of heat, which is communicated to the internal parts of the foot; and, together with the contraction upon the heels occaſioned by the form of the ſhoe, muſt certainly cauſe exquiſite pain. This is frequently ſucceeded by a violent inflammation in the internal parts of the hoof, and is the cauſe of that diſeaſe in the feet ſo fatal to the very beſt of our horſes, commonly termed a *founder*. This is alſo the reaſon why horſes, after a journey or a hard ride, are obſerved to ſhift their feet ſo frequently, and to lie down much.

"If we attend further to the convex ſurface of this ſhoe, and the convexity of the pavement upon which

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FARRIERY,

Horse-shoes.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

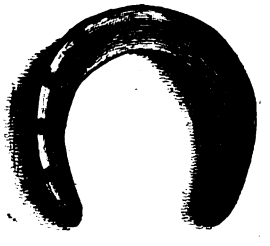
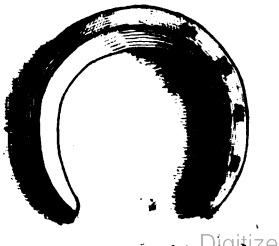


Fig. 5.



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A. Bell Prin. Mal. Sculptor fecit.

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Shoeing. which horſes walk, it will then be evident that it is impoſſible for them to keep their feet from ſlipping in this form of ſhoe, eſpecially upon declivities of ſtreets.

"It is alſo a common practice, eſpecially in this place, to turn up the heels of the ſhoes into what is called *cramps* or *caukers*, by which means the weight of the horſe is confined to a very narrow ſurface, viz. the inner round edge of the ſhoe-rim and the points or caukers of each heel, which ſoon wear round and blunt; beſides, they for the moſt part are made by far too thick and long. The conſequence is, that it throws the horſe forward upon the toes, and is apt to make him ſlip and ſtumble. To this cauſe we muſt likewiſe aſcribe the frequent and ſudden lameneſs horſes are ſubject to in the legs, by twiſting the ligaments of the joints, tendons, &c.

"I do not affirm that caukers are always hurtful, and ought to be laid aſide: On the contrary, I grant, that they, or ſome ſuch like contrivance, are extremely neceſſary, and may be uſed with advantage upon flat ſhoes where the ground is ſlippery; but they ſhould be made thinner and ſharper than thoſe commonly uſed, ſo as to ſink into the ground, otherwiſe they will rather be hurtful than of any advantage.

"The Chineſe are ſaid to account a ſmall foot an ornament in their women, and for that purpoſe, when young, their feet are confined in ſmall ſhoes. This no doubt produces the deſired effect; but muſt neceſſarily be very prejudicial to them in walking, and apt to render them entirely lame.

"This practice, however, very much reſembles our manner of ſhoeing horſes: for, if we looked upon it as an advantage to them to have long feet, with narrow low heels, and ſuppoſing we obſerved no inconvenience to attend it, or bad conſequence to follow it, we could not poſſibly uſe a more effectual means to bring it about, than by following the method already deſcribed.

"In ſhoeing a horſe, therefore, we ſhould in this, as in every other caſe, ſtudy to follow nature: and certainly that ſhoe which is made of ſuch a form as to reſemble as near as poſſible the natural tread and ſhape of the foot, muſt be preferable to any other.

"But it is extremely difficult to lay down fixed rules with reſpect to the proper method to be obſerved in treating the hoofs of different horſes: it is equally difficult to lay down any certain rule for determining the preciſe form to be given their ſhoes. This will be obvious to every judicious practitioner, from the various conſtructions of their feet, from diſeaſe, and from other cauſes that may occur; ſo that a great deal muſt depend upon the diſcretion and judgment of the operator, in proportioning the ſhoe to the foot, by imitating the natural tread, to prevent the hoof from contracting a bad ſhape.

"In order, therefore, to give ſome general idea of what may be thought moſt neceſſary in this matter, I ſhall endeavour to deſcribe that form of ſhoe and method of treating the hoofs of horſes, which from experience I have found moſt beneficial.

"*Proper Method.* It is to be remembered, that a horſe's ſhoe ought by no means to reſt upon the ſole, otherwiſe it will occaſion lameneſs; therefore it muſt reſt entirely on the cruſt: and, in order that we may imitate the natural tread of the foot, the ſhoe muſt be made flat (if the height of the ſole does not forbid it); it muſt be of an equal thickneſs all around the outſide of the rim (A); and on that part of it which is to be placed immediately next the foot, a narrow rim or margin is to be formed, not exceeding the breadth of the cruſt upon which it is to reſt, with the nail-holes placed exactly in the middle; and from this narrow rim the ſhoe is to be made gradually thinner towards its inner edge. See fig. 5. Shoeing.

"The breadth of the ſhoe is to be regulated by the ſize of the foot, and the work to which the horſe is accuſtomed: but, in general, it ſhould be made rather broad at the toe, and narrow towards the extremity of each heel, in order to let the frog reſt with freedom upon the ground. The neceſſity of this has been already ſhown.

"The ſhoe being thus formed and ſhaped like the foot, the ſurface of the cruſt is to be made ſmooth, and the ſhoe fixed on with eight or at moſt ten nails, the heads of which ſhould be ſunk into the holes, ſo as to be equal with the ſurface of the ſhoe. The ſole, frog, and bars, as I have already obſerved, ſhould never be pared, farther than taking off what is ragged from the frog, and any excreſcences or inequalities from the ſole. And it is very properly remarked by Mr Oſmer, 'That the ſhoe ſhould be made ſo as to ſtand a little wider at the extremity of each heel than the foot itſelf: otherwiſe, as the foot grows in length, the heel of the ſhoe in a ſhort time gets within the heel of the horſe; which preſſure often breaks the cruſt, and produces a temporary lameneſs, perhaps a corn.'

"This method of ſhoeing horſes I have followed long before Mr Oſmer's treatiſe on that ſubject was publiſhed; and for theſe ſeveral years paſt I have endeavoured to introduce it into practice.

"But ſo much are farriers, grooms, &c. prejudiced in favour of the common method of ſhoeing and paring out the feet, that it is with difficulty they can even be prevailed upon to make a proper trial of it.

"They cannot be ſatisfied unleſs the frog be finely ſhaped, the ſole pared, and the bars cut out, in order to make the heels appear wide (B). This practice gives them a ſhow of wideneſs for the time; yet that, together with the concave form of the ſhoe, forwards the contraction of the heels, which, when confirmed, renders the animal lame for life.

"In this flat form of ſhoe, its thickeſt part is upon the outſide of the rim, where it is moſt expoſed to be worn; and being made gradually thinner towards its inner edge, it is therefore much lighter than the common concave ſhoe: yet it will laſt equally as long, and with more advantage to the hoof; and as the frog or heel is allowed to reſt upon the ground, the foot enjoys the ſame points of ſupport as in its natural ſtate. It muſt therefore be much eaſier for the horſe in his

(A) For a draught-horſe about half an inch thick, and larger in proportion for a ſaddle-horſe.
(B) Wide open heels are looked upon as a mark of a ſound good hoof.

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Shoeing. way of going, and be a means of making him surer-footed. It is likewise evident, that, from this shoe, the hoof cannot acquire any bad form; when, at the same time, it receives every advantage that possibly could be expected from shoeing. In this respect it may very properly be said, that we make the shoe to the foot, and not the foot to the shoe, as is but too much the case in the concave shoes, where the foot very much resembles that of a cat's fixed into a walnut-shell.

"It is to be observed, that the hoofs of young horses, before they are shoed, for the most part are wide and open at the heels, and that the crust is sufficiently thick and strong to admit of the nails being fixed very near the extremities of each. But, as I have formerly remarked, from the constant use of concave shoes, the crust of this part of the foot grows thinner and weaker; and when the nails are fixed too far back, especially upon the inside, the horse becomes lame: to avoid this, they are placed more towards the fore-part of the hoof. This causes the heels of the horse to have the greater spring upon the heels of the shoe, which is so very detrimental as to occasion lameness; whereas, by using this flat form of shoe, all these inconveniences are avoided; and if the hoofs of young horses, from the first time that they were shoed, were continued to be constantly treated according to the method here recommended, the heels would always retain their natural strength and shape.

"By following this flat method of shoeing, and manner of treating the hoofs, several horses now under my care, that were formerly tender-footed, and frequently lame, while shoed with broad concave shoes, are now quite sound, and their hoofs in as good condition as when the first shoes were put upon them: In particular, the horse that wore the broad concave shoes, from which the drawings of fig. 2. and 3. were taken, now goes perfectly sound in the open narrow kind of shoes, as represented fig. 4. 5.

"If farriers considered attentively the design of shoeing horses, and would take pains to make themselves acquainted with the anatomical structure of the foot, they would then be convinced, that this method of treating the hoofs, and this form of shoe is preferable to that which is so generally practised.

"It has been alleged, that in this form of shoe horses do not go so well as in that commonly used. This objection will easily be laid aside, by attending to the following particulars. There are but few practitioners that can or will endeavour to make this sort of shoe as it ought to be. The iron, in forming it, does not so easily turn into the circular shape necessary as in the common shoe; and perhaps this is the principal reason why farriers object to it, especially where they work much by the piece. And as many horses that are commonly shoed with concave shoes have their soles considerably higher than the crust, if the shoe is not properly formed, or if it is made too flat, it must unavoidably rest upon the sole, and occasion lameness.

"The practice of paring the sole and frog is also so prevalent, and thought so absolutely necessary, that it is indiscriminately practised, even to excess, on all kinds of feet: And while this method continues to be followed, it cannot be expected that horses can go upon hard ground (on this open shoe) with that freedom they would do if their soles and frogs were allowed to remain in their full natural strength. Shoeing.

"Experience teaches us, that, in very thin-soled shoes, we feel an acute pain from every sharp-pointed stone we happen to tread upon. Horses are sensible of the same thing in their feet, when their soles, &c, are pared too thin. Hence they who are prejudiced against this method, without ever reflecting upon the thin state of the sole, &c. are apt to condemn it, and draw their conclusions more from outward appearances than from any reasoning or knowledge of the structure of the parts. From a due attention likewise to the structure of a horse's foot in a natural state, it will be obvious, that paring away the sole, frog, &c. must be hurtful, and in reality is destroying that substance provided by nature for the defence of the internal parts of the foot: From such practice it must be more liable to accidents from hard bodies, such as sharp stones, nails, glass, &c. From this consideration we will likewise find, that a narrow piece of iron adapted to the shape and size of the foot, is the only thing necessary to protect the crust from breaking or wearing away; the sole, &c. requiring no defence if never pared.

"There is one observation I would farther make, which is, that the shoe should be made of good iron, well worked, or what smiths call *hammer-hardened*, that is, beat all over lightly with a hammer when almost cold. The Spaniards and Portuguese farriers use this practice greatly, insomuch that many people, who have seen them at work, have reported that they form their horses shoes without heating them in the fire as we do. It is well known, that heating of iron till it is red softens it greatly; and when shoes thus softened are put upon horses feet, they wear away like lead. But when the shoes are well hammered, the iron becomes more compact, firm, and hard; so that a well-hammered shoe, though made considerably lighter, yet will last as long as one that is made heavier; the advantage of which is obvious, as the horse will move his feet with more activity, and be in less danger of cutting his legs.

"The common concave shoes are very faulty in this respect; for, in fitting or shaping them to the foot, they require to be frequently heated, in order to make them bend to the unequal surface which the hoof acquires from the constant use of these shoes: they thereby become soft; and to attempt to harden them by beating or hammering when they are shaped to the foot would undo the whole. But flat shoes, by making them, when heated, a little narrower than the foot, will, by means of hammering, become wider, and acquire a degree of elasticity and firmness which it is necessary they should have, but impossible to be given them by any other means whetever; so that any farrier, from practice, will soon be able to judge, from the quality of the iron, how much a shoe, in fitting it to the circumference of the hoof, will stretch by hammering when it is almost cold: this operation, in fitting flat shoes, will be the less difficult, especially when it is considered, that as there are no inequalities on the surface of the hoof (or at least ought not to be) which require to be bended thereto, shoes of this kind only require to be made smooth and flat; hence

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Shoeing. hence they will preſs equally upon the circumference or cruſt of the hoof, which is the natural tread of a horſe."

When the roads, &c. are covered with ice, it becomes neceſſary to have the heels of the ſhoes turned up, and frequently ſharpened, in order to prevent horſes from ſlipping and falling. As this cannot be done without the frequent moving of the ſhoes, which breaks and deſtroys the cruſt of the hoofs where the nails are drove, to prevent this, it is recommended to thoſe who are willing to be at the expence, to have ſteel points ſcrewed into the heels or quarters of each ſhoe, which might be taken out and put in occaſionally.

The method of doing this properly, as directed by Mr Clark, is firſt to have the ſhoes fitted to the ſhape of the hoof, then to make a ſmall round hole in the extremity of each heel, or in the quarters, about three-eighths of an inch in diameter, or more, in proportion to the breadth and ſize of the ſhoe; in each of theſe holes a ſcrew is to be made; the ſteel points are likewiſe to have a ſcrew on them, exactly fitted to that in the ſhoes. Care muſt be taken that the ſcrew on the points is no longer, when they are ſcrewed into the ſhoe, than the thickneſs of the latter. The ſteel points are to be made ſharp; they may either be made ſquare, triangular, or chiſſel pointed, as may be moſt agreeable; the height of the point above the ſhoe ſhould not exceed half an inch for a ſaddle horſe; they may be made higher for a draught horſe. The key or handle that is neceſſary to ſcrew them in and out occaſionally, is made in the ſhape of the capital letter T, and of a ſufficient ſize and ſtrength; at the bottom of the handle, a ſocket or cavity muſt be made, properly adapted to the ſhape of the ſteel point, and ſo deep as to receive the whole head of the point that is above the ſhoe. In order to prevent the ſcrew from breaking at the neck, it will be neceſſary to make it of a gradual taper; the ſame is likewiſe to be obſerved of the female ſcrew that receives it, that is, the hole muſt be wider on the upper part of the ſhoe than the under part; the ſharp points may be tempered or hardened, in order to prevent them from growing too ſoon blunt; but when they become blunt, they may be ſharpened as at firſt. Theſe points ſhould be unſcrewed when the horſe is put into the ſtable, as the ſtones will do them more injury in a few minutes than a days riding on ice. A draught horſe ſhould have one point on each ſhoe, as that gives them firmer footing in drawing on ice; but for a ſaddle horſe, when they are put there, they are apt to make him trip and ſtumble. Shoeing.

When the ſhoes are provided with theſe points, a horſe will travel on ice with the greateſt ſecurity and ſteadineſs, much more ſo than on cauſeway or turnpike roads, as the weight of the horſe preſſes them down in the ice at every ſtep he makes.

Farthing, Faſces. FARTHING, a ſmall Engliſh copper coin, amounting to one-fourth of a penny. It was anciently called *fourthing*, as being the fourth of the integer or penny.

Farthing of Gold, a coin uſed in ancient times, containing in value the fourth part of a noble, or 20d. ſilver. It is mentioned in the ſtat. 9 Hen. V. cap. 7. where it is enacted, that there ſhall be good and juſt weight of the noble, half-noble, and farthing of gold.

Farthing of Land ſeems to differ from *yardingdeal*. For in a ſurvey-book of the manor of Weſt-Hapton in Devonſhire, there is an entry thus: A. B. holds ſix farthings of land at 126l. *per ann.* So that the farthing of land muſt have been a conſiderable quantity, far more than a rood.

FASCES, in Roman antiquity, axes tied up together with rods, or ſtaves, and borne before the Roman magiſtrates as a badge of their office and authority.

According to Florus, the uſe of the faſces was introduced by the elder Tarquin the fifth king of Rome; and were then the mark of the ſovereign dignity. In after-times they were borne before the conſuls, but by turns only, each his day; they had each of them 12, borne by as many lictors. Theſe faſces conſiſted of branches of elm; having in the middle a ſecuris or axe, the head of which ſtood out beyond the reſt. Publicola took the axe out of the faſces, as Plutarch aſſures us, to remove from the people all occaſion of terror. After the conſuls, the pretors aſſumed the faſces. In the government of the decemvirs, it was the practice at firſt for only one of them to have the faſces. Afterwards each of them had twelve, after the manner of the kings. Faſcets, Faſciæ.

When the magiſtrates who by right had the axes carried before them, had a mind to ſhow ſome deference to the people, or ſome perſon of ſingular merit, they either ſent away the lictors, or commanded them to lower the faſces before them, which was called *ſubmittere faſces*. Many inſtances of this occur in Roman hiſtory.

FASCETS, in the art of making glaſs, are the irons thruſt into the mouths of bottles, in order to convey them to the annealing tower.

FASCIA, in antiquity, a thin ſaſh which the Roman women wrapped round their bodies, next to the ſkin, in order to make them ſlender. Something of this ſort ſeems alſo to have been in uſe amongſt the Grecian ladies, if we can depend upon the repreſentation given by Terence, Eun. Act. 2. Sc. 4.

Haud ſimilis eſt virginum noſtrarum, quas matres ſtudent
Demiſſis humeris eſſe—vincto corpore, ut graciles ſiant.

Fascia, in architecture, ſignifies any flat member having a conſiderable breadth and but a ſmall projecture, as the band of an architrave, larmier, &c. In brick-buildings, the jettings out of the bricks beyond the windows in the ſeveral ſtories except the higheſt are called *faſcias*, or *faſcia*.

Fascia Lata, in anatomy, a muſcle of the leg, called alſo *ſemi-membranoſus*. See Anatomy, *Table of the Muſcles*.

Fasciæ, in aſtronomy, the belts ſeen on the diſk of the ſuperior planets Mars, Jupiter, and Saturn. See Astronomy *paſſim*.

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Fascialis || Fashion-pieces.

FASCIALIS, in anatomy, one of the muscles of the thigh, called *sartorius*. See ANATOMY, *Table of the Muscles*.

FASCINATION (from the Greek βασκαινειν, to *fascinate* or *bewitch*), a sort of witchcraft supposed to operate either by the eye or the tongue.

Ancient writers distinguish two sorts of fascination, one performed by looking, or the efficacy of the eye. Such is that spoken of by Virgil in his third eclogue:

Nescio quis teneros oculus mihi fascinat *agnos.*

The second by words, and especially malignant praises. Such is that mentioned by the same poet in his seventh eclogue:

Aut, si ultra placitum laudârit, baccare frontem
Cingite, ne vati noceat mala lingua futuro

Horace touches on both kinds in his first book of epistles:

Non istic obliquo oculo mea commoda quisquam
Limat, non odio obscuro, morsuque venenat.

FASCINES, in fortification, faggots of small wood, of about a foot diameter, and six feet long, bound in the middle, and at both ends. They are used in raising batteries, making chandeliers, in filling up the moat to facilitate the passage to the wall, in binding the ramparts where the earth is bad, and in making parapets of trenches to screen the men. Some of them are dipped in melted pitch or tar; and, being set on fire, serve to burn the enemy's lodgments or other works.

In the corrupt Latin they use *fascenina*, *fascennia*, and *fascinata*, &c. to signify the pales, fascines, &c. used to inclose the ancient castles, &c.

FASCIOLA, in zoology, the FLUKE or GOURD WORM: A genus of insects of the order of vermes intestina; of which the characters are these: The body is flattish, and has a vent hole at the extremity and on the belly. There are several species. 1. The hepatica, or liver-fluke, grows to two thirds of an inch in length, though it is more usually met with not half that size; and its breadth is nearly equal to two thirds of its length: it is flattish, but somewhat rounded on the back, and has about eight deep longitudinal furrows in two series; its skin is soft and whitish, with a tinge of brown. The hinder part is rounded, the fore part is furnished with a large mouth; it bears some resemblance to the seed of the common gourd, whence it has acquired the name of the *gourd worm*. It is found in fresh waters, in ditches, at the roots of stones, sometimes in the intestines, and often in the substance of the other viscera in quadrupeds. It often infests the liver of sheep, and on that account is called *hepatica*. Bags with salt in them should be placed in the fold that the sheep might lick them, which is the only remedy. 2. The Intestinalis, or Intestinal Fluke, is of a long slender form, if extended; when contracted, of a suboval form. Inhabits the intestines of fresh-water fish; often found in breams. 3. The barbata, is white, with transverse papillæ in the mouth. It is of an oblong shape, and about the size of a cucumber-seed. It is found in the intestines of the sepia lotigo.

Plate CXC.

FASHION-PIECES, in the sea-language, the aftmost or hindmost timbers of a ship, which terminate the breadth, and form the shape of the stern. They are united to the stern-post, and to the extremity of the wing-transom, by a rabbit, and a number of strong nails or spikes driven from without.

Fast.

FAST, in general, denotes the abstinence from food, (see FASTING); but is more particularly used for such abstinence on a religious account.

Religious fasting has been practised by most nations from the remotest antiquity. Some divines even pretend its origin in the earthly paradise, where our first parents were forbidden to eat of the tree of knowledge. But though this seems carrying the matter too far, it is certain, that the Jewish church has observed fasts ever since its first institution. Nor were the neighbouring heathens, viz. the Egyptians, Phœnicians, and Assyrians, without their fasts. The Egyptians, according to Herodotus, sacrificed a cow to Isis, after having prepared themselves by fasting and prayer: a custom which he likewise ascribes to the women of Cyrene. Porphyry affirms, that the Egyptians, before their stated sacrifices, always fasted a great many days, sometimes for six weeks; and that the least behoved to be for seven days: during all which time the priests and devotees not only abstained from flesh, fish, wine, and oil; but even from bread, and some kinds of pulse. These austerities were communicated by them to the Greeks, who observed their fasts much in the same manner. The Athenians had the Eleusinian and Thesmophorian fasts, the observation of which was very rigorous, especially among the women, who spent one whole day sitting on the ground in a mournful dress, without taking any nourishment. In the island of Crete, the priests of Jupiter were obliged to abstain all their lives from fish, flesh, and baked meats. Apuleius informs us, that whoever had a mind to be initiated in the mysteries of Cybele were obliged to prepare themselves by fasting ten days; and, in short, all the pagan deities, whether male or female, required this duty of those that desired to be initiated into their mysteries, of their priests and priestesses that gave the oracles, and of those that came to consult them.

Among the heathens fasting was also practised before some of their military enterprises. Aristotle informs us, that the Lacedemonians having resolved to succour a city of the allies, ordained a fast throughout the whole extent of their dominions, without excepting even the domestic animals: and this they did for two ends; one to spare provisions in favour of the besieged; the other to draw down the blessing of heaven upon their enterprise. The inhabitants of Tarentum, when besieged by the Romans, demanded succours from their neighbours of Rhegium, who immediately commanded a fast throughout their whole territories. Their enterprise having had good success by their throwing a supply of provisions into the town, the Romans were obliged to raise the siege; and the Tarentines, in memory of this deliverance, instituted a perpetual fast.

Fasting has always been reckoned a particular duty among philosophers and religious people, some of whom have carried their abstinence to an incredible length. At Rome it was practised by kings and emperors themselves. Numa Pompilius, Julius Cæsar, Augustus, Vespasian, and others, we are told, had their stated fast-days: and Julian the apostate was so exact in this observance as to outdo the priests themselves, and even the most rigid philosophers. The Pythagoreans kept a con-

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White Headed Eagle.

Swallow Tailed Hawk.

Pigeon Hawk.

Iceland Falcon.

Fishing Hawk.

Fasciola.

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Faſt. continual lent; but with this difference, that they believed the uſe of fiſh to be equally unlawful with that of fleſh. Beſides their conſtant temperance, they alſo frequently faſted rigidly for a very long time. In this reſpect, however, they were all outdone by their maſter Pythagoras, who continued his faſts for no leſs than 40 days together. Even Apollonius Tyaneus, one of his moſt famous diſciples, could never come up to him in the length of his faſts, though they greatly exceeded thoſe of the ordinary Pythagoreans. The gymnoſophiſts, or brachmans of the eaſt, are alſo very remarkable for their ſevere faſtings; and the Chineſe, according to father le Comte, have alſo their ſtated faſts, with forms of prayer for preſerving them from barrenneſs, inundations, earthquakes, &c. The Mahometans too, who poſſeſs ſo large a part of Aſia, are very remarkable for the ſtrict obſervance of their faſts; and the exactneſs of their derviſes in this reſpect is extraordinary.

Faſting was often uſed by the heathens for ſuperſtitious purpoſes; ſometimes to procure the interpretations of dreams; at others, to be an antidote againſt their pernicious conſequences. A piece of ſuperſtition prevails to this day among the Jews; who, though expreſsly forbidden to faſt on Sabbath-days, think themſelves at liberty to diſpenſe with this duty when they happen to have frightful and unlucky dreams the night preceding, that threatened them with great misfortunes. On theſe occaſions they obſerve a formal faſt the whole day; and at night the patient, having invited three of his friends, addreſſes himſelf to them ſeven times in a very ſolemn manner, ſaying, "May the dream I have had prove a lucky one!" And his friends anſwer as many times, "Amen, may it be lucky, and God make it ſo!" After which, in order to encourage him, they conclude the ceremony with theſe words of Eccleſiaſtes, "Go eat thy bread with joy;" and then ſet themſelves down to table. They have alſo added ſeveral faſts not commanded in the law of Moſes, particularly three, in memory of ſore diſtreſſes their nation has ſuffered at different times. The abſtinence of the ancient Jews commonly laſted 27 or 28 hours at a time; beginning before ſunſet, and not ending till ſome hours after ſunſet next day. On theſe days they were obliged to wear white robes in token of grief and repentance; to cover themſelves with ſackcloth, or their worſt clothes: to lie on aſhes; to ſprinkle them on their head, &c. Some ſpent the whole night and day following in the temple or ſynagogue, in prayers and other devotions, barefooted, with a ſcourge in their hands, of which they ſometimes made a good uſe in order to raiſe their zeal. Laſtly, in order to complete their abſtinence, at night they were to eat nothing but a little bread dipped in water, with ſome ſalt for ſeaſoning; except they choſe to add to their repaſt ſome bitter herbs and pulſe.

The ancients, both Jews and Pagans, had alſo their faſts for purifying the body, particularly the prieſts and ſuch as were any way employed at the altars; for when nocturnal diſorders happened to theſe, it was unlawful for them to approach all the next day, which they were bound to employ in purifying themſelves. On this account, at great feſtivals, where their miniſtry could not be diſpenſed with, it was uſual for them, on the eve thereof, not only to faſt, but alſo to abſtain from ſleep, for the greater certainty. For this purpoſe the high-prieſt had under-officers to wake him, if overtaken with ſleep; againſt which other preſervatives were alſo made uſe of. Faſtermans, Faſti.

FASTERMANS, or FASTING-MEN, q. d. *homines habentes*, was uſed in our ancient cuſtoms for men in repute and ſubſtance; or rather for pledges, ſureties, or bondſmen, who, according to the Saxon polity, were faſt bound to anſwer for one another's peaceable behaviour.

FASTI, in Roman antiquity, the kalendar wherein were expreſſed the ſeveral days of the year, with their feaſts, games, and other ceremonies.

There were two ſorts of faſti, the greater and leſs; the former being diſtinguiſhed by the appellation *faſti magiſtrales*, and the latter by that of *faſti kalendares*.

1. The *Faſti Kalendares*, which were what was properly and primarily called *faſti*, are defined by Feſtus Pompeius to be books containing a deſcription of the whole year: *i. e.* Ephemerides, or diaries, diſtinguiſhing the ſeveral kinds of days, *feſti*, *profeſti*; *faſti*, *nefaſti*, &c. The author hereof was Numa, who committed the care and direction of the faſti to the pontifex maximus, whom the people uſed to go and conſult on every occaſion. This cuſtom held till the year of Rome 450, when C. Flavius, ſecretary to the pontifices, expoſed in the forum a liſt of all the days whereon it was lawful to work; which was ſo acceptable to the people, that they made him curule ædile.

Theſe leſſer faſti, or faſti calendares, were of two kinds, *urbani* and *ruſtici*.

The *faſti urbani*, or faſti of the city, were thoſe which obtained or were obſerved in the city. Some will have them thus called becauſe they were expoſed publicly in divers parts of the city; though, by the various inſcriptions or gravings thereof on antique ſtones, one would imagine that private perſons had them likewiſe in their houſes. Ovid undertook to illuſtrate theſe faſti urbani, and comment on them, in his Libri Faſtorum, whereof we have the ſix firſt books ſtill remaining; the ſix laſt, if ever they were written, being loſt.

In the *faſti ruſtici*, or country faſti, were expreſſed the ſeveral days, feaſts, &c. to be obſerved by the country people: for as theſe were taken up in tilling the ground, fewer feaſts, ſacrifices, ceremonies, and holidays, were enjoined them than the inhabitants of cities; and they had alſo ſome peculiar ones not obſerved at Rome. Theſe ruſtic faſti contained little more than the ceremonies of the calends, nones, and ides; the fairs, ſigns of the zodiac, increaſe and decreaſe of the days, the tutelary gods of each month, and certain directions for rural works to be performed each month.

2. In the greater faſti, or *Faſti Magiſtrales*, were expreſſed the ſeveral feaſts, with every thing relating to the gods, religion, and the magiſtrates; the emperors, their birth-days, offices, days conſecrated to them, and feaſts and ceremonies eſtabliſhed in their honour, or for their proſperity, &c. With a number of ſuch circumſtances did flattery at length ſwell the faſti; when they became denominated *Magni* to diſtinguiſh them from the bare kalendar, or faſti kalendares.

FASTI was alſo a chronicle or regiſter of time, wherein

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Fasti, Fasting.

in the several years were denoted by the respective consuls, with the principal events that happened during their consulates; these were called also *fasti consulares*, or *consular fasti*.

Fasti, or *Dies Fasti*, also denoted court-days. The word *fasti fastorum*, is formed of the verb *fari*, "to speak," because during those days the courts were opened, causes might be heard, and the prætor was allowed *fari*, to pronounce the three words, *do*, *dico*, *addico*: The other days wherein this was prohibited were called *nefasti*: thus Ovid,

Ille nefastus erit, per quem tria verba silentur:
Fastus erit, per quem lege licebit agi.

These *dies fasti* were noted in the kalender by the letter *F*: but observe, that there were some days *ex parte fasti*, partly *fasti*, partly *nefasti*; i. e. justice might be distributed at certain times of the day, and not at others. These days were called *intercisi*, and were marked in the kalendar thus; *F. P. fastos primo*, where justice might be demanded during the first part of that day.

FASTING, the abstaining from food. See Fast.

Many wonderful stories have been told of extraordinary fasting; great numbers of which undoubtedly must be false. Others, however, we have on very good authority, of which some are mentioned under the article Abstinence. Another we have in the

Fasting Woman. A full account of this very uncommon case is given in the Phil. Trans. Vol. LXVII. Part I. the substance of which follows: The woman, whose name was *Janet M'Leod*, an inhabitant in the parish of Kincardine in Rossshire, continued healthy till she was 15 years of age, when she had a pretty severe epileptic fit; after this she had an interval of health for four years, and then another epileptic fit which continued a whole day and a night. A few days afterwards she was seized with a fever, which continued with violence several weeks, and from which she did not perfectly recover for some months. At this time she lost the use of her eye-lids; so that she was under a necessity of keeping them open with the fingers of one hand, whenever she wanted to look about her. In other respects she continued in pretty good health; only she never had any appearance of menses, but periodically spit up blood in pretty large quantities, and at the same time it flowed from the nose. This discharge continued several years; but at last it ceased: and soon after she had a third epileptic fit, and after that a fever from which she recovered very slowly. Six weeks after the crisis, she stole out of the house unknown to her parents, who were busied in their harvest work, and bound the sheaves of a ridge before she was observed. In the evening she took to her bed, complaining much of her *heart* (most probably her *stomach*, according to the phraseology of that country) and her head. From that time she never rose for five years, but was occasionally lifted out of bed. She seldom spoke a word, and took so little food that it seemed scarce sufficient to support a sucking infant. Even this small quantity was taken by compulsion; and at last, about Whitsunday 1763, she totally refused every kind of food or drink. Her jaw now became so fast locked, that it was with the greatest difficulty her father was able to open her teeth a little, in order to admit a small quantity of gruel or whey; but of this so much generally ran out at the corners of her mouth, that they could not be sensible any had been swallowed. About this time they got some water from a noted medicinal spring in Brae-Mar, some of which they attempted to make her swallow, but without effect. They continued their trials, however, for three mornings; rubbing her throat with the water, which run out at the corners of her mouth. On the third morning during the operation, she cried out, "Give me more water;" and swallowed with ease all that remained in the bottle. She spoke no more intelligibly for a year; though she continued to mutter some words, which her parents only understood, for 14 days. She continued to reject all kinds of food and drink till July 1765. At this time her sister thought, by some signs she made, that she wanted her jaws opened; and this being done, not without violence, she called intelligibly for a drink, and drank with ease about an English pint of water. Her father then asked her why she would not make some signs when she wanted a drink? to which she answered, why should she when she had no desire. It was now supposed that she had regained the faculty of speech; and her jaws were kept open for about three weeks by means of a wedge. But in four or five days she became totally silent, and the wedge was removed because it made her lips sore. She still, however, continued sensible; and when her eye-lids were opened, knew every body, as could be guessed from the signs she made.

Fasting.

By continuing their attempts to force open her jaws, two of the under foreteeth were driven out; and of this opening her parents endeavoured to avail themselves by putting some thin nourishing drink into her mouth; but without effect, as it always returned by the corners. Sometimes they thought of thrusting a little dough of oatmeal through this gap of the teeth, which she would retain a few seconds, and then return with something like a straining to vomit, without one particle going down. Nor were the family sensible of any thing like swallowing for four years, excepting the small draught of Brae-Mar water and the English pint of common water. For the last three years she had not any evacuation by stool or urine, except that once or twice a-week she passed a few drops of urine, about as much, to use the expression of her parents, as would wet the surface of a halfpenny. In this situation she was visited by Dr Mackenzie, who communicated the account of her case to the Royal Society. He found her not at all emaciated; her knees were bent and the hamstrings tight, so that her heels almost touched her buttocks. She slept much, and was very quiet: but when awake, kept a constant whimpering like a newborn weakly infant. She never could remain a moment on her back, but always fell to one side or another; and her chin was clapped close to her breast, nor could it by any force be moved backwards.

The doctor paid his first visit in the month of October; and five years afterwards, viz. in October 1772, was induced to pay her a second visit, by hearing that she was recovering, and had begun to eat and drink. The account given him was most extraordinary. Her parents one day returning from their country-labours (having left their daughter fixed to her bed as usual), were greatly surprised to find her sitting upon her hams, on the side of the house opposite to her bed-place, spinning with her mother's distaff. All the food she took at

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Faſting. at that time was only to crumble a little oat or barley cake in the palm of her hand, as if to feed a chicken. She put little crumbs of this into the gap of her teeth; rolled them about for ſome time in her mouth; and then ſucked out of the palm of her hand a little water, whey, or milk; and this only once or twice a-day, and even that by compulſion. She never attempted to ſpeak; her jaws were faſt locked, and her eyes ſhut. On opening her eye-lids, the balls were found to be turned up under the edge of the os frontis; her countenance was ghaſtly, her complexion pale, and her whole perſon emaciated. She ſeemed ſenſible, and tractable in every thing except in taking food. This ſhe did with the utmoſt reluctance, and even cried before ſhe yielded. The great change of her looks Dr Mackenzie attributed to her ſpinning flax on the diſtaff, which exhauſted too much of the ſaliva; and therefore he recommended to her parents to confine her totally to the ſpinning of wool. In 1775, ſhe was viſited again, and found to be greatly improved in her looks as well as ſtrength; her food was alſo conſiderably increaſed in quantity; though even then ſhe did not take more than would be ſufficient to ſuſtain an infant of two years of age.

The following remarkable inſtances of animals being able to live long without food, are related by Sir William Hamilton in his account of the late earthquakes in Italy, (*Phil. Tranſ.* vol. 73.) "At Soriano (ſays he), two fattened hogs that had remained buried under a heap of ruins, were taken out alive the 42d day; they were lean and weak, but ſoon recovered." Again, "At Meſſina two mules belonging to the Duke de Belviſo remained under a heap of ruins, one of them 22 days, and the other 23 days: they would not eat for ſome days, but drank water plentifully, and are now recovered. There are numberleſs inſtances of dogs remaining many days in the ſame ſituation; and a hen belonging to the Britiſh vice-conſul at Meſſina, that had been cloſely ſhut up under the ruins of his houſe, was taken out the 22d day, and is now recovered; it did not eat for ſome days, but drank freely; it was emaciated, and ſhowed little ſigns of life at firſt. From theſe inſtances, and thoſe related before of the hogs at Soriano, and ſeveral others of the ſame kind that have been related to me, but which being leſs remarkable I omit, one may conclude, that long faſting is always attended with great thirſt and total loſs of appetite."

An inſtance of a ſimilar kind, not leſs remarkable than either of the two preceding, we find in the Gentleman's Magazine for Jan. 1785, communicated by a correſpondent, as follows: "During the heavy ſnow which fell in the night of the 7th of January 1776, a parcel of ſheep belonging to Mr John Wolley, of Matlock, in Derbyſhire, which were paſtured on that part of the Eaſt Moor that lies within the manor of Matlock, were covered with the drifted ſnow: in the courſe of a day or two all the ſheep that were covered with the ſnow were found again, except two, which were conſequently given up as loſt; but on the 14th of February following (ſome time after the break of the ſnow in the valleys, and 38 days after the fall), as a ſervant was walking over a large parcel of driſted ſnow which remained on the declivity of a hill, a dog he had with him diſcovered one of the two ſheep that had been loſt, by winding (or ſcenting) it through a ſmall aperture which the breath of the ſheep had made in the ſnow; the ſervant thereupon dug away the ſnow, and releaſed the captive from its priſon; it immediately ran to a neighbouring ſpring, at which it drank for a conſiderable time, and afterwards rejoined its old companions as though no ſuch accident had befallen it. On inſpecting the place where it was found, it appeared to have ſtood between two large ſtones which lay parallel with each other at about two feet and an half diſtance, and probably were the means of protecting it from the great weight of the ſnow, which in that place lay ſeveral yards thick; from the number of ſtones around it, it did not appear that the ſheep had been able to pick up any food during its confinement. Soon afterwards its owner removed it to ſome low lands; but as it had nearly loſt its appetite, it was fed with bread and milk for ſome time: in about a fortnight after its enlargement it loſt its ſight and wool; but in a few weeks afterwards they both returned again, and in the courſe of the following ſummer it was quite recovered. The remaining ſheep was found dead about a week after the diſcovery of the other."

Faſting || Fat.

In the ſame publication † is recorded the death of one Caleb Elliot, a viſionary enthuſiaſt, who meant to have faſted 40 days, and actually ſurvived 16 without food, having obſtinately refuſed ſuſtenance of every kind.

† Suppl. for 1789, Obituary, p. 1211.

FASTOLF (Sir John), a valiant and renowned Engliſh officer, a knight-banneret and of the garter, who ſerved in France under Henry IV. V. and VI. was deſcended from an ancient family in Norfolk, and was born about the year 1377. He was as much diſtinguiſhed for his virtue at home as for his valour abroad; and became no leſs amiable in his private, than he had been admirable in his public character. He died in 1459, upwards of 80 years of age, as we learn from his noted cotemporary William Caxton the firſt Engliſh printer. By an unaccountable miſtake it has been aſſerted, that Shakeſpear's Falſtaff was drawn to ridicule this great man; and this has made judicious biographers more ſtudious to preſerve his reputation.

FAT, an oily concrete ſubſtance depoſited in different parts of animal bodies. See ANATOMY, n° 83.

Strong exerciſe, preternatural heat, an acrimonious ſtate of the juices, and other like cauſes, by which the oily parts of the blood are attenuated, reſolved, or evacuated, prevent the generation of fat; labours of the mind alſo have this effect, as well as labour or intemperature of the body. Hence reſt and plentiful food are ſufficient to fatten brutes; but with men it is often otherwiſe. It is ſurpriſing how ſoon ſome birds grow fat; ortalons in 24 hours, and larks ſtill ſooner.

Fats may be divided, from their conſiſtence, into three kinds: (1.) The ſoft and thin, which grow perfectly liquid in a very ſmall heat; (2.) The thick and conſiſtent, which liquify leſs readily; and, (3.) The hard and firm, which require a ſtill ſtronger heat to melt them. The firſt is called *Pinguedo*; the ſecond, *Axungia*; and the third, *Adeps*, as taken from the animal; and *Sebum*, or *Sevum*, when freed from the ſkins, &c. This uſe of the names, however, is not conſtant, ſome employing them differently.

A great number of fats have been kept in the ſhops, for

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Fat. for making ointments, plaſters, and other medicinal compoſitions; as hog's-lard, the fat of the boar, the fox, the hair, dog, wild cat, Alpine mouſe, beaver; that of hens, ducks, geeſe, ſtorks; of the whale, pike, ſerpents, viper, &c. as alſo human fat.—In regard to all theſe kind of ſubſtances, however, much depends upon the manner of purifying or trying, and of keeping them. Fat.

To obtain fat pure, it muſt be cut into pieces, and cleaned from the interpoſed membranes and veſſels. It muſt then be cleanſed from its gelatinous matter by waſhing with water, till the water comes from it colourleſs and inſipid; it is afterwards to be melted with a moderate heat in a proper veſſel with a little water; and it is to be kept thus melted till the water be entirely evaporated, which is known by the diſcontinuance of the boiling, which is cauſed by the water only, and which laſts till not a drop of it remains: it is afterwards to be put into an earthen pot, where it fixes; then it is exceedingly white, ſufficiently pure for the purpoſes of pharmacy or chemical examination.

Fat thus purified has very little taſte, and a weak, but peculiar, ſmell.

For the analyſis, chemical properties, &c. of fat, ſee CHEMISTRY, n° 1015. and 1428.

One of the chief uſes of fat probably is, to receive into its compoſition, to blunt and correct, a great part of the acids of the aliments, and which are more than are requiſite to the compoſition of the nutritive juice, or which nature could not otherwiſe expel. This is certain, that the greater the quantity of aliments is taken by healthy animals above what is neceſſary for their nouriſhment and reproduction, the fatter they become. Hence animals which are caſtrated, which are not much exerciſed, or which are come to an age when the loſs and production of the ſeminal fluid is leſs, and which at the ſame time conſume much ſucculent aliment, generally become fatter, and ſometimes exceedingly ſo.

Although fat be very different from truly animaliſed ſubſtances, and appears not eaſily convertible into nutritive juices, it being generally difficult of digeſtion, and apt to become rancid, as butter does in the ſtomachs of many perſons; yet in certain caſes it ſerves to the nouriſhment and reparation of the body. Animals certainly become lean, and live upon their fat, when they have too little food, and when they have diſeaſes which prevent digeſtion and the production of the nutritive juice; and in theſe caſes the fatter animals hold out longer than the leaner. The fat appears to be then abſorbed by the veſſels deſigned for this uſe, and to be transformed into nutritive juice.

FAT, in the ſea-language, ſignifies the ſame with broad. Thus a ſhip is ſaid to have a fat quarter, if the truſſing-in or tuck of her quarter be deep.

FAT likewiſe denotes an uncertain meaſure of capacity. Thus a fat of iſinglaſs contains from 3½ hundred weight to 4 hundred weight; a fat of unbound books, half a maund or four bales; of wire, from 20 to 25 hundred weight; and of yarn, from 220 to 221 bundles.

FAT, or VAT, is uſed alſo for ſeveral utenſils: as, 1. A great wooden veſſel, employed for the meaſuring of malt, and containing a quarter or eight buſhels. 2. A large brewing veſſel, uſed by brewers to run their wort in. 3. A leaden pan or veſſel for the making of ſalt at Droitwich. Fats.

FATA MORGANA, a very remarkable aerial phenomenon, which is ſometimes obſerved from the harbour of Meſſina and adjacent places, at a certain height in the atmoſphere. The name, which ſignifies the *Fairy Morgana*, is derived from an opinion of the ſuperſtitious Sicilians, that the whole ſpectacle is produced by fairies, or ſuch like viſionary inviſible beings. The populace are delighted whenever it appears; and run about the ſtreets ſhouting for joy, calling every body out to partake of the glorious ſight.

This ſingular meteor has been deſcribed by various authors; but the firſt who mentioned it with any degree of preciſion was Father Angelucci, whoſe account is thus quoted by Mr Swinburne in his *Tour through Sicily*: "On the 15th of Auguſt 1643, as I ſtood at my window, I was ſurpriſed with a moſt wonderful delectable viſion. The ſea that waſhes the Sicilian ſhore ſwelled up, and became, for ten miles in length, like a chain of dark mountains; while the waters near our Calabrian coaſt grew quite ſmooth, and in an inſtant appeared as one clear poliſhed mirror, reclining againſt the aforeſaid ridge. On this glaſs was depicted, in *chiaro ſcuro*, a ſtring of ſeveral thouſands of pilaſtres, all equal in altitude, diſtance, and degree of light and ſhade. In a moment they loſt half their height, and bent into arcades, like Roman aqueducts. A long cornice was next formed on the top, and above it roſe caſtles innumerable, all perfectly alike. Theſe ſoon ſplit into towers, which were ſhortly after loſt in colonnades, then windows, and at laſt ended in pines, cypreſſes, and other trees, even and ſimilar. This is the Fata Morgana, which for 26 years I had thought a mere fable."

To produce this pleaſing deception, many circumſtances muſt concur, which are not known to exiſt in any other ſituation. The ſpectator muſt ſtand with his back to the eaſt, in ſome elevated place behind the city, that he may command a view of the whole bay; beyond which the mountains of Meſſina riſe like a wall, and darken the back ground of the picture. The winds muſt be huſhed, the ſurface quite ſmoothed, the tide at its height, and the waters preſſed up by currents to a great elevation in the middle of the channel. All theſe events coinciding, as ſoon as the ſun ſurmounts the eaſtern hills behind Reggio, and riſes high enough to form an angle of 45 degrees on the water before the city, every object exiſting or moving at Reggio will be repeated 1000 fold upon this marine looking-glaſs; which, by its tremulous motion, is as it were cut into facets. Each image will paſs rapidly off in ſucceſſion as the day advances, and the ſtream carries down the wave on which it appeared. Thus the parts of this moving picture will vaniſh in the twinkling of an eye. Sometimes the air is at that moment ſo impregnated with vapours, and undiſturbed by winds, as to reflect objects in a kind of aerial ſcreen, riſing about 30 feet above the level of the ſea. In cloudy heavy weather, they are drawn on the ſurface of the water, bordered with fine priſmatical colours.

To the above account we ſhall add the following, given by M. Houel, whoſe judgment and veracity render his authority highly reſpectable. "In fine ſummer days, when the weather is calm, there riſes above the great

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Fate || Fathemites

great current a vapour, which acquires a certain denſity, ſo as to form in the atmoſphere horizontal priſms, whoſe ſides are diſpoſed in ſuch a manner, that when they come to their proper degree of perfection, they reflect and repreſent ſucceſſively, for ſome time (like a moveable mirror), the objects on the coaſt or in the adjacent country. They exhibit by turns the city and ſuburbs of Meſſina, trees, animals, men, and mountains. They are certainly beautiful aerial moving pictures. There are ſometimes two or three priſms, equally perfect; and they continue in this ſtate eight or ten minutes. After this, ſome ſhining inequalities are obſerved upon the ſurface of the priſm, which render confuſed to the eye the objects which had been before ſo accurately delineated, and the picture vaniſhes. The vapour forms other combinations, and is diſperſed in air. Different accounts have been given of this ſingular appearance; which for my part I attribute to a bitumen that iſſues from certain rocks at the bottom of the ſea, and which is often ſeen to cover a part of its ſurface in the canal of Meſſina. The ſubtle parts of this bitumen being attenuated, combined, and exhaled with the aqueous globules that are raiſed by the air, and formed into bodies of vapour, give to this condenſed vapour more conſiſtence; and contribute, by their ſmooth and poliſhed particles, to the formation of a kind of aerial cryſtal, which receives the light, reflects it to the eye, and tranſmits to it all the luminous points which colour the objects exhibited in this phenomenon, and render them viſible."

FATE, (*fatum*), denotes an inevitable neceſſity depending upon a ſuperior cauſe. The word is formed *a fando*, "from ſpeaking:" and primarily implies the ſame with *effatum*, viz. a word or decree pronounced by God; or a fixed ſentence whereby the Deity has preſcribed the order of things, and allotted to every perſon what ſhall befal him.

The Greeks called it ειμαρμενη, as it were a chain or neceſſary ſeries of things indiſſolubly linked together. It is alſo uſed to expreſs a certain unavoidable deſignation of things, by which all agents, both neceſſary and voluntary, are ſwayed and directed to their ends. See NECESSITY.

In this laſt ſenſe, fate is diſtinguiſhed into, 1. Aſtrological fate, ariſing from the influence and poſition of the heavenly bodies; which (it is ſuppoſed) gave laws both to the elements and mixed bodies, and to the wills of men. 2. Stoical fate, defined by Cicero an order or ſeries of cauſes, wherein, cauſe being linked to cauſe, each produces another, and thus all things flow from one prime cauſe. To this fate the Stoics ſubject even the gods.

Fate is divided by later authors into phyſical and divine. 1. Phyſical fate is an order and ſeries of natural cauſes appropriated to their effects. By this fate it is that fire warms, bodies communicate motion to each other, &c. and the effects of it are all the events and phenomena of nature. 2. Divine fate is what is more uſually called *Providence*. See PROVIDENCE.

FATES, in mythology. See PARCÆ.

FATHEMITES, FATEMITES, or FATHIMITES, the deſcendants of Mahomet by Fathema, or Fatima, his daughter. They never enjoyed the khalifat of Mecca or Bagdad, but reigned in Barbary and Egypt. See the hiſtory of theſe countries.

FATHER, a term of relation denoting a perſon who hath begot a child. See PARENT and CHILD.

Father || Faviſſæ.

By the laws of Romulus, a father had an unlimited power over his children. Amongſt the Lacedemonians, as we learn from Ariſtotle's politics, the father of three children was excuſed from the duty of mounting guard for the ſecurity of the city; and a father of four children, was exempted from every public burden. The Poppæan law, amongſt the Romans, granted many valuable privileges to the fathers of three children; amongſt which one was, that he ſhould be excuſed from civil offices, and that the mother ſhould have liberty, in her father's life-time, to make a will, and manage her eſtate without the authority of tutors.

Natural FATHER, is he who has illegitimate children. See BASTARD; and LAW, N° clxi. 33. clxxxii. 3, 4.

Adoptive FATHER, is he who takes the children of ſome other, and acknowledges them as his own. See ADOPTION.

Putative FATHER, is he who is only the reputed or ſuppoſed father. Joſeph was putative father of our Saviour.

FATHER-in-law, is a perſon married to a woman who has children by a former huſband, &c. to which children he is ſaid to be a father-in-law.

FATHER is alſo uſed in theology for the firſt Perſon in the Trinity.

FATHER is alſo uſed in a figurative ſenſe on divers moral and ſpiritual occaſions. Thus, it is applied to the patriarchs; as we ſay Adam was the father of all mankind, Abraham the father of the faithful, &c.

FATHER, in church-hiſtory, is applied to ancient authors who have preſerved in their writings the traditions of the church. Thus St Chryſoſtom, St Baſil, &c. are called *Greek fathers*, and St Auguſtine and St Ambroſe *Latin fathers*. No author who wrote later than the 12th century is dignified with the title of *Father*.

FATHER, is alſo a title of honour given to prelates and dignitaries of the church, to the ſuperiors of convents, to congregations of eccleſiaſtics, and to perſons venerable for their age or quality. Thus we ſay, the right reverend father in God, the father-general of the Benedictines, the fathers of the council of Nice, father of his country, &c.

FATHERLASHER, in ichthyology. See COTTUS.

FATHOM, a long meaſure containing ſix feet, uſed chiefly at ſea for meaſuring the length of cables and cordage.

FATNESS. See CORPULENCY.—It is obſerved, that for one fat perſon in France or Spain, there are an hundred in England and Holland. This is ſuppoſed to be from the uſe of new malt liquors, more than from the difference of climates or degrees of perſpiration. Indolence may cauſe fatneſs in ſome few conſtitutions; but, in general, thoſe who are diſpoſed to this habit will be fat in ſpite of every endeavour to the contrary, but that of deſtroying health.

FATUARII, in antiquity, were perſons who, appearing inſpired, foretold things to come. The word is formed of *Fatua*, wife of the god Faunus, who was ſuppoſed to inſpire women with the knowledge of futurity, as Faunus himſelf did the men.—Fatua had her name from *fari*, q. d. *vaticinari*, "to propheſy."

FAVISSÆ, in antiquity, were, according to Feſtus,

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Fauna || Favorinus

tus and Gellius, ciſterns to keep water in: but the faviſſæ in the Capitol at Rome were dry ciſterns or ſubterraneous cellars, where they laid up the old ſtatues, broken veſſels, and other things uſed in the temple. Theſe were much the ſame with what, in ſome of the modern churches, are called the *archives* and *treaſury*.

FAUNA, a deity among the Romans. She was daughter of Picus, and was originally called *Marica*. Her marriage with Faunus procured her the name of *Fauna*, and her knowledge of futurity that of *Fatua* and *Fatidica*. It is ſaid that ſhe never ſaw a man after her marriage with Faunus, and that her uncommon chaſtity occaſioned her being ranked among the gods after death. She is the ſame, according to ſome, as *Bona Mater*.

FAUNALIA, in antiquity, Roman feaſts celebrated in honour of the god Faunus, who was the ſame among the Romans with the *Pan* of the Greeks.

The Faunalia were held on the day of the nones of December; i. e. on the fifth day of that month. The principal ſacrifice was a roe-buck; or rather, according to Horace, a kid, attended with libations of wine and burning of incenſe. It was properly a country feſtival, being performed in the fields and villages with peculiar joy and devotion. Horace gives us a very gay deſcription thereof in the 18th ode of his third book:

——Tener pleno cadit hœdus anno:
Larga nec deſunt Veneris ſodali
Vina crateræ: vetus ara multo
Fumat odore.

Struvius in his Roman kalendar marks the feaſt of Faunus on the day of the ides of February, which is the 30th day of that month; and the Faunalia he places on the fifth of the ides of December, or the 9th of that month: and in chap. ix. he ſhows, that there really were two Faunalia; the one in February, mentioned by Ovid, Faſt. lib. vi. ver. 246. the other on the 9th of December, mentioned by Horace in the place juſt cited.

FAUNS, (Fauni), among the ancients, were a ſpecies of demi-gods inhabiting the foreſts; called alſo *Sylvans (Sylvani)*, and little differing from the Satyrs. They delighted more particularly in vineyards; and they generally appear as attendants of Bacchus, in the repreſentations of Bacchanal feaſts and proceſſions. They were repreſented as half men, half goats, having the horns, ears, feet, and tail of a goat, a very flat noſe, and the reſt human. Though the Fauns were held for demi-gods, yet they were ſuppoſed to die after a long life. Arnobius ſhows that their father or chief, Faunus himſelf, only lived 120 years.

FAUNUS, (fab. hiſt.) a ſon of Picus, who reigned in Italy about 1300 years before the Auguſtan age. His bravery, as well as wiſdom, have given riſe to the tradition that he was ſon of Mars. His great popularity, and his fondneſs for agriculture, made his ſubjects revere him as one of their country deities after death. He was repreſented with all the equipage of the ſatyrs, and was conſulted to give oracles.

FAVONIUS, among the Romans, the wind which blew directly from the weſt.

FAVORINUS, an ancient orator and philoſopher of Gaul, who flouriſhed under the emperor Adrian, and taught with high reputation both at Athens and Rome. Many works are attributed to him; among the reſt, a Greek miſcellaneous hiſtory often quoted by Diogenes Laertius.

Fauſtus || Fealty.

FAUSTUS. See Fust.

FAWKES (Francis), an ingenious poet, had his ſchool-education at Leeds; from whence he was tranſplanted to Jeſus-college, Cambridge, where he took the degrees in arts. Entering early into holy orders, he ſettled firſt at Bramham in Yorkſhire, near the elegant ſeat of that name (Mr Lane's), which he celebrated in verſe in 1745, in a 4to pamphlet anonymous. His firſt poetical publications were, Gawen Douglas's Deſcription of May and Winter modernized. Removing afterwards to the curacy of Croydon in Surry, he recommended himſelf to the notice of Archbiſhop Herring, then reſident there on account of his health, to whom beſides other pieces he addreſſed an Ode on his recovery in 1754, printed in Mr Dodſley's Collection. In conſequence, his Grace collated him in 1755 to the vicarage of Orpington with St Mary Gray in Kent; and Mr Fawkes lamented his patron's death in 1757 in a pathetic Elegy ſtyled *Aurelius*, firſt printed with his Grace's Seven Sermons, in 1763. He married about the ſame time Miſs Purrier of Leeds. In April 1774, by the late Dr Plumtree's favour, he exchanged his vicarage for the rectory of Hayes. He was alſo one of the chaplains to the Princeſs Dowager of Wales. He publiſhed a volume of Poems by ſubſcription in 8vo, 1761; the Poetical Kalendar 1763; and Poetical Magazine 1764, in conjunction with Mr Woty; Partridge-ſhooting, an Eclogue, to the Honourable Cha. York, 1767, 4to; and a Family Bible, with notes, in 4to, a compilation. But his great ſtrength lay in tranſlation, in which, ſince Pope, few have equalled him. Witneſs his fragments of Menander (in his Poems); his Works of Anacreon, Sappho, Bion, Moſchus, and Muſæus, 12mo, 1760; his Idyllium of Theocritus, by ſubſcription, 8vo, 1767; and his Argonautics of Apollonius Rhodius, by ſubſcription alſo (a poſthumous publication, completed by the Reverend Mr Meen of Emanuel College, Cambridge), 8vo, 1780. He died Auguſt 26. 1777.

FAWN, among ſportſmen, a buck or doe of the firſt year; or the young one of the buck's breed in its firſt year.

FE, FO, or *Fohi*, the name of the chief god of the Chineſe, whom they adore as the ſovereign of heaven. They repreſent him ſhining all in light, with his hands hid under his robes, to ſhow that his power does all things inviſibly. He has at his right hand the famous Confucius, and at his left Lanza or Lanca, chief of the ſecond ſect of their religion.

FEAL, a provincial term for ſod or turf.

Feal-Dikes, a cheap ſort of fence common in Scotland; built with feal or ſod dug up by the ſpade from the ſurface of graſs-ground, conſiſting of the upper mould rendered tough and coherent by the matted roots of the graſs thickly interwoven with it. If only a very thin bit of the upper ſurface is pared off with a paring ſpade, the pieces are called *divots*. Theſe being of a firmer conſiſtence, are more durable when built into dikes than feal, but much more expenſive alſo.

FEALTY, in law, an oath taken on the admittance of any tenant, to be true to the lord of whom he holds

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Fear, Feast.

holds his land: by this oath the tenant holds in the freeſt manner, on account that all who have fee hold *per fidem et fiduciam*, that is, by fealty at the leaſt.

This fealty, at the firſt creation of it, bound the tenant to fidelity, the breach of which was the loſs of his fee. It has been divided into general and ſpecial: general, that which is to be performed by every ſubject to his prince; and ſpecial, required only of ſuch as, in reſpect of their fee, are tied by oath to their lords. To all manner of tenures, except tenancy at will, and frank-almoign, fealty is incident, though it chiefly belongs to copyhold eſtates held in fee and for life. The form of this oath, by ſtat. 17 Edw. II. is to run as follows. "I A. B. will be to you my lord D. true and faithful, and bear to you faith for the lands and tenements which I hold of you; and I will truly do and perform the cuſtoms and ſervices that I ought to do to you. So help me God."

FEAR, one of the paſſions of the human mind: (ſee PASSION). It is defined, an apprehenſion of impending evil, attended with a deſire of avoiding it.

Fear in the extreme is called *fright* or *terror*. See FRIGHT.

FEAR, in ſcripture, is uſed in various ſenſes.

The *fear of God* is either filial or ſervile. The filial fear is a holy affection or gracious habit in the ſoul, whereby it is inclined to obey all God's commandments, and to hate and avoid evil. Slaviſh or ſervile fear is the conſequence of guilt; it is a judicial impreſſion from the ſad thoughts of the provoked majeſty of heaven; it is an alarm within that diſturbs the reſt of a ſinner. Though this fear be in wicked men, yet it often proves preparative to faith and repentance.

Fear is likewiſe uſed for the *object* of fear. Thus it is ſaid, "the *fear* of Iſaac," to deſcribe the God whom Iſaac feared, (Gen. xxxi. 42.), and in Prov. i. 26. "I will mock you when your *fear* cometh;" that is, the calamity you feared. God ſays, that he will ſend his *fear* before his people; that is, a dread wrought by him, in order to terrify and deſtroy the inhabitants of Canaan.

FEAR (*Metus*, *Pavor*, or *Timor*), was deified by the Pagans. Tullus Hoſtilius brought the worſhip of this deity to Rome. The Ephori of Sparta erected a temple to Fear, near their tribunal, to ſtrike an awe into thoſe who approached it. Fear was likewiſe worſhipped at Corinth. The poets did not forget this imaginary deity. Virgil places her in the entrance of hell, in company with diſeaſes, old age, &c. *Æn.* vi. 273. Ovid places her in the retinue of Tiſiphone one of the furies, *Met.* iv. 483.

FEAST, or FESTIVAL, in a religious ſenſe, is a ceremony of feaſting and thankſgiving. The word is formed of the Latin *feſtum*, which ſome derive *a feriari* "to keep holiday;" others from the Greek ἑστιάω "I feaſt or entertain," of ἑστία "hearth, fire."

Feaſts, and the ceremonies thereof, have made great part of the religion of almoſt all nations and ſects; witneſs thoſe of the Greeks, Romans, Hebrews, Chriſtians, and Mahometans.

The firſt feaſts among the Greeks were celebrated in ſolemn aſſemblies of the whole nation, on occaſion of their games, as the Olympic, the Pythian, the Iſthmian, and Nemæan: in proceſs of time they had many others, the principal of which are enumerated in the courſe of this work. Feaſt.

The Romans alſo had abundance of ſtated feaſts in honour of their deities and heroes; ſuch were the Saturnalia, Cerealia, Lupercalia, Liberalia, Neptunalia, Conſualia, Portumnalia, Vulcanalia, Palilia, Divalia, &c. See SATURNALIA, &c.

They had alſo feaſts inſtituted occaſionally; as Carmentalia, Quirinalia, Terminalia, Floralia, Compitalia, Lemuria, Vernalia, beſide other moveable and occaſional ones: as to give thanks to the gods for benefits received; to implore their aſſiſtance, or to appeaſe their wrath, &c. as the Paganalia, Feralia, Bacchanalia, Ambarvalia, Amburbalia, Suovetaurilia, and divers others, particularly denominated *feriæ*; as Sementinæ, Latinæ, &c. See each of theſe feaſts, and *feriæ* in its proper place. The feaſts were divided into days of ſacrifice, and days of banqueting and feaſting; days of games, and days of reſt or *feriæ*.

There being but little hiſtory written, or at leaſt publiſhed, in thoſe days, one end of feaſts was to keep up the remembrance of paſt occurrences.

The principal feaſts of the Jews were the feaſts of trumpets, that of the expiation, of tabernacles, of the dedication, of the paſſover, of pentecoſt, and that of purification. See EXPIATION, &c.

The modern Jews have other feaſts marked in their kalendar of modern inſtitution. The Mahometans, beſides their weekly feaſt or ſabbath, which is kept on Friday, have two ſolemn feaſts, the firſt of which is called the *Feaſt of Victims*, and celebrated on the tenth day of the laſt month of their year; and the ſecond called *Bairam*: The Chineſe have two ſolemn feaſts in the year, in memory of Confucius, beſides others of leſs note on other days of the year.

Feaſts among us are either *immoveable* or *moveable*.

Immoveable Feaſts are thoſe conſtantly celebrated on the ſame day of the year; the principal of theſe are Chriſtmas-day or the Nativity, the Circumciſion, Epiphany, Candlemas, or the Purification; Lady-day, or the Annunciation, called alſo the *Incarnation* and *Conception*; All Saints, and All Souls; beſides the days of the ſeveral apoſtles, St Thomas, St Paul, &c. which with us are feaſts, though not *feriæ*. See each feaſt under its proper article.

Moveable Feaſts are thoſe which are not confined to the ſame day of the year. Of theſe the principal is Eaſter, which gives law to all the reſt, all of them following, and keeping their proper diſtances from it; ſuch are Palm-Sunday, Good-Friday, Aſh-Wedneſday, Sexageſima, Aſcenſion-day, Pentecoſt, and Trinity-Sunday. See EASTER, SEXAGESIMA, PENTECOST, TRINITY, &c.

The four feaſts which the Engliſh laws take ſpecial notice of are, the Annunciation of the bleſſed Virgin Mary or Lady-day, the 25th of March; the nativity of St John the Baptiſt, held on the 24th of June; the Feaſt of St Michael the Archangel, on the 29th of September; and that of St Thomas the Apoſtle, on the 21ſt of December: on which quarterly days rent on leaſes is uſually reſerved to be paid (5 and 6 Edw. VI. cap. 3. 3 Jac. I. cap. 1. 12 Car. II. cap. 30.)

Beſide theſe feaſts which are *general*, and enjoined by the church, there are others *local* and *occaſional*,

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Feaſt. enjoined by the magiſtrate, or voluntarily ſet on foot by the people; ſuch are the days of thankſgiving for delivery from wars, plagues, &c. Such alſo are the vigils or wakes in commemoration of the dedications of particular churches. See VIGIL, &c.

The prodigious increaſe of feaſt-days in the Chriſtian church commenced towards the cloſe of the fourth century, and was occaſioned by the diſcovery that was then made of the remains of martyrs and other holy men, for the commemoration of whom they were eſtabliſhed. Theſe, inſtead of being ſet apart for pious exerciſes, were abuſed in indolence, voluptuouſneſs, and criminal practices. Many of them were inſtituted on a pagan model, and perverted to ſimilar purpoſes.

FEAST of Death, or *Feaſt of Souls*, a ſolemn religious ceremony in uſe among the ſavages of America; ſome of whom thus teſtify their reſpect for the deceaſed every eight years; and others, as the Hurons and Iroquois, every ten years.

The day of this ceremony is appointed by public order; and nothing is omitted, that it may be celebrated with the utmoſt pomp and magnificence. The neighbouring tribes are invited to be preſent, and to join in the ſolemnity. At this time all who have died ſince the laſt ſolemn occaſion are taken out of their graves: thoſe who have been interred at the greateſt diſtance from the villages are diligently ſought for, and brought to this great rendezvous of carcaſes.

It is not difficult to conceive the horror of this general diſinterment; but it cannot be deſcribed in a more lively manner than it is done by Lafitau, to whom we are indebted for the moſt authentic account of thoſe nations.

"Without queſtion (ſays he), the opening of theſe tombs diſplays one of the moſt ſtriking ſcenes that can be conceived; this humbling portrait of human miſery, in ſo many images of death, wherein ſhe ſeems to take a pleaſure to paint herſelf in a thouſand various ſhapes of horror, in the ſeveral carcaſes, according to the degree in which corruption has prevailed over them, or the manner in which it has attacked them. Some appear dry and withered; others have a ſort of parchment upon their bones; ſome look as if they were baked and ſmoked, without any appearance of rottenneſs; ſome are juſt turning towards the point of putrefaction; whilſt others are all ſwarming with worms, and drowned in corruption. I know not which ought to ſtrike us moſt, the horror of ſo ſhocking a ſight, or the tender piety and affection of theſe poor people toward their departed friends; for nothing deſerves our admiration more than that eager diligence and attention with which they diſcharge this melancholy duty of their tenderneſs; gathering up carefully even the ſmalleſt bones, handling the carcaſes, diſguſtful as they are, with every thing loathſome, cleanſing them from the worms, and carrying them upon their ſhoulders through tireſome journeys of ſeveral days, without being diſcouraged from the offenſiveneſs of the ſmell, and without ſuffering any other emotions to ariſe than thoſe of regret, for having loſt perſons who were ſo dear to them in their lives, and ſo lamented in their death.

"They bring them into their cottages, where they prepare a feaſt in honour of the dead; during which their great actions are celebrated, and all the tender intercourſes which took place between them and their friends are piouſly called to mind. The ſtrangers, who have come ſometimes many hundred miles to be preſent on the occaſion, join in the tender condolence; and the women, by frightful ſhrieks, demonſtrate that they are pierced with the ſharpeſt ſorrow. Then the dead bodies are carried from the cabins for the general reinterment. A great pit is dug in the ground, and thither, at a certain time, each perſon, attended by his family and friends, marches in ſolemn ſilence, bearing the dead body of a ſon, a father, or a brother. When they are all convened, the dead bodies, or the duſt of thoſe which were quite corrupted, are depoſited in the pit: then the torrent of grief breaks out anew. Whatever they poſſeſs moſt valuable is interred with the dead. The ſtrangers are not wanting in their generoſity, and confer thoſe preſents which they have brought along with them for the purpoſe. Then all preſent go down into the pit, and every one takes a little of the earth, which they afterwards preſerve with the moſt religious care. The bodies, ranged in order, are covered with entire new furs, and over theſe with bark, on which they throw ſtones, wood, and earth. Then taking their laſt farewel, they return each to his own cabin.

"We have mentioned, that in this ceremony the ſavages offer, as preſents to the dead, whatever they value moſt highly. This cuſtom, which is univerſal among them, ariſes from a rude notion of the immortality of the ſoul. They believe this doctrine moſt firmly, and it is the principal tenet of their religion. When the ſoul is ſeparated from the body of their friends, they conceive that it ſtill continues to hover around it, and to require and take delight in the ſame things with which it formerly was pleaſed. After a certain time, however, it forſakes this dreary manſion, and departs far weſtward into the land of ſpirits. They have even gone ſo far as to make a diſtinction between the inhabitants of the other world; ſome, they imagine, particularly thoſe who in their lifetime have been fortunate in war, poſſeſs a high degree of happineſs, have a place for hunting and fiſhing, which never fails, and enjoy all ſenſual delights, without labouring hard in order to procure them. The ſouls of thoſe, on the contrary, who happen to be conquered or ſlain in war, are extremely miſerable after death."

FEAST is alſo uſed for a banquet, or a ſumptuous meal, without any immediate view to religion.

The uſe of the word, in this ſenſe, ariſes hence; that a part of the ceremony of many of the ancient feſtivals, both thoſe of the heathens and agapæ of the Chriſtians, was good eating; though Mr Huet chooſes to derive the word from *feſtinare*, which, in an ancient Latin verſion of Origen's Comment on Matthew, ſignifies "to feaſt:" *Ut veniens illuc Jeſus feſtinet cum diſcipulis ſuis.*

Social or civil feaſts were alſo expreſſed by the words *convivium* and *compotatio*, or *concœnatio*. Cicero ſays, that in the Roman tongue, the word *convivium*, which means "people aſſembled at table," is more ſignificant than the Greek word *compotatio* or *concœnatio*: the Roman, ſays he, expreſſes the conjunction of body and mind which ought to take place at an entertainment; the Greek denotes what relates to the body alone.

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Feaſt. As food is neceſſary to our exiſtence, it makes a bond of aſſociation among mankind. People at a feaſt, ſays one of the ancients, ſeem to form but one body, one ſoul. All nations, whether ſavage or civilized, have regarded the pleaſures of the table as the occaſion of the moſt agreeable ſociety. This ſpecies of enjoyment (abſtracting from its ſuſceptibility of abuſe) makes but one family of all that it brings together. It levels the diſtinctions introduced by policy or prejudice, and diſpoſes men to regard one another as brethren. It is here that people feel the equality eſtabliſhed by nature; here they forget the evils of life; they extinguiſh their hatred, and make their enmities ceaſe. For this reaſon Ariſtotle conſiders as a breach of the ſocial principle that cuſtom of the Egyptians of eating apart, and praiſes the convivial repaſts eſtabliſhed by Minos and Lycurgus.

The Perſians generally deliberated on buſineſs at table, but never determined or put their determinations in execution except in the morning before having eaten.

When the Germans, ſays Tacitus, wanted to reconcile enemies, to make alliances, to name chiefs, or to treat of war and peace; it was during the repaſt that they took counſel; a time in which the mind is moſt open to the impreſſions of ſimple truths, or moſt eaſily animated to great attempts. Theſe artleſs people during the conviviality of the feaſt ſpoke without diſguiſe. Next day they weighed the counſels of the former evening: they deliberated at a time when they were not diſpoſed to feign, and took their reſolution when they were leaſt liable to be deceived.

People of rank among the Rhodians, by a fundamental law of the ſtate, were obliged to dine daily with thoſe who had the management of affairs, in order to deliberate with them concerning ſuch things as were neceſſary or uſeful for the country; and on this account the principal miniſters of the kingdom were obliged to keep open table for all who could be of uſe to the ſtate.

Among the Romans, the place where they ſupped was generally the veſtibule, that a more retired part of the houſe might not encourage licentiouſneſs and diſorder. There were ſeveral laws that reſtricted their meals to theſe veſtibules.

When luxury reigned in Rome, they had ſuperb halls for their entertainments. Lucullus had many, each of which bore the name of ſome deity; and this name was a mark which indicated to the ſervants the expence of the entertainment. The expence of a ſupper in Lucullus's hall of Apollo amounted to 50,000 drachmas.

The hall in which Nero feaſted, by the circular motion of its walls and ceiling, imitated the revolutions of the heavens, and repreſented the different ſeaſons of the year, changing at every courſe, and ſhowering down flowers and perfumes on the gueſts.

The Romans did not, as we do, uſe but one table at their feaſts; they had generally two; the firſt was for the ſervices of animal food, which was afterwards removed, and another introduced with fruits; at this laſt they ſung and poured out their libations. The Greks and eaſtern nations had the ſame cuſtom, and even the Jews in their ſolemn feaſts and at ſacrifices.

The Romans, in the time of Nero, had tables made of citron wood brought from Mauritania; they were varniſhed with purple and gold, and were raiſed on feet of carved ivory. It is ſaid that they were more precious than gold. Dion Caſſius affirms, that Seneca had 500 of theſe, which he made uſe of one after another; and Tertullian tells us that Cicero had but one. The Romans choſe the king of the feaſt by a throw of the dice. Feaſt.

We learn from Herodotus, that the ancients had neither cups nor bowls, but that they drank out of little horns tipt with ſilver or gold.

Under the reign of Charles V. of France, the cuſtom of placing the lights upon the table was not yet introduced. A number of domeſtics held the candles in their hands during the whole time of the repaſt.

The Greeks and Romans kept a domeſtic for the purpoſe of reading during their meals and feaſts. Sometimes the chief of the family himſelf performed the office of reader; and hiſtory informs us, that the Emperor Severus often read while his family ate. The time of reading was generally at ſupper; and gueſts were invited to a reading as they are now a-days to play cards.

The Greeks, in their flouriſhing times, did not profane, according to their own expreſſion, the *holineſs* of the table; but rather adorned it with ingenious and elegant converſation: they propoſed moral topics, of which Plutarch has preſerved a collection.

Ancient philoſophers remark, that heroes rarely aſſembled convivially without bringing affairs of conſequence into diſcourſe, or deliberating upon thoſe that regarded either preſent events or future contingencies.

The Scythians, while at meat, uſed to make the ſtrings of their bows reſound, leſt their warlike virtues might be enfeebled or loſt in this ſeaſon of pleaſure.

When Rome was corrupted with luxury, ſingers, dancers, muſicians, ſtage-players, and people that told pleaſant tales, were brought into the hall to amuſe the gueſts.

Plutarch informs us, that Cæſar, after his triumphs, treated the Roman people at 22,000 tables; and by calculation it would ſeem that there were at theſe tables upwards of 200,000 perſons.

At the end of the feaſt the Romans drunk out of a large cup as often as there were letters in the name of their miſtreſſes.

Feaſting ſeems to have been the chief delight of the Germans, Gauls, Britons, and all the other Celtic nations; in which they indulged themſelves to the utmoſt, as often as they had an opportunity. "Among theſe nations (ſays an author who had carefully ſtudied their manners) there is no public aſſembly, either for civil or religious purpoſes, duly held; no birth-day, marriage, or funeral properly celebrated; no treaty of peace or alliance rightly cemented, without a great feaſt." It was by frequent entertainments of this kind that the great men or chieftains gained the affections and rewarded the ſervices of their followers; and thoſe who made the greateſt feaſts were ſure to be moſt popular, and to have the greateſt retinue. Theſe feaſts (in which plenty was more regarded than elegance) laſted commonly ſeveral days, and the gueſts ſeldom retired until they had conſumed all the proviſions and exhauſted all the liquors. Athenæus deſcribes *Pelloutier Hiſt. Celt.* l. 2 c. 12. p. 463.

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Feast. scribes an entertainment that was given by Arcamnes, a very wealthy prince in Gaul, which continued a whole year without interruption, and at which all the people of Gaul, and even all ſtrangers who paſſed through that country, were made welcome. At theſe feaſts they ſometimes conſulted about the moſt important affairs of ſtate, and formed reſolutions relating to peace and war; imagining that men ſpoke their real ſentiments with the greateſt freedom, and were apt to form the boldeſt deſigns, when their ſpirits were exhilarated with the pleaſures of the table. The converſation at theſe entertainments very frequently turned on the great exploits which the gueſts themſelves or their anceſtors had performed in war; which ſometimes occaſioned quarrels and even bloodſhed. It was at a feaſt that the two illuſtrious Britiſh princes, Carbar and Oſcar, quarrelled about their own bravery and that of their anceſtors, and fell by mutual wounds, (*Oſſian*, vol. ii. p. 8, &c.)

As to the drink uſed at thoſe feaſts, particularly in Britain, it ſeems probable, that before the introduction of agriculture into the iſland, mead or honey diluted with water was the only ſtrong liquor known to its inhabitants, as it was to many other ancient nations in the ſame circumſtances. This continued to be a favourite beverage among the ancient Britons and their poſterity long after they had become acquainted with other liquors. The mead-maker was the eleventh perſon in dignity in the courts of the ancient princes of Wales, and took place of the phyſician. The following ancient law of that principality ſhows how much this liquor was eſteemed by the Britiſh princes.—"There are three things in the court which muſt be communicated to the king before they are made known to any other perſon: 1. Every ſentence of the judge; 2. Every new ſong; and, 3. Every caſk of mead." This was perhaps the liquor which is called by Oſſian the joy and ſtrength of ſhells, with which his heroes were ſo much delighted.—After the introduction of agriculture, ale or beer became the moſt general drink of all the Britiſh nations who practiſed that art, as it had long been of all the Celtic people on the continent. (See Ale.) If the Phœnicians or Greeks imported any wine into Britain, it was only in very ſmall quantities; that moſt generous liquor being very little known in this iſland before it was conquered by the Romans. The drinking veſſels of the Gauls, Britons, and other Celtic nations were, for the moſt part, made of the horns of oxen and other animals; but thoſe of the Caledonians conſiſted of large ſhells, which are ſtill uſed by ſome of their poſterity in the Highlands of Scotland.

The diſhes in which the meat was ſerved up were either of wood or earthen-ware, or a kind of baſkets made of oſiers. Theſe laſt were moſt uſed by the Britons, as they very much excelled in the art of making them both for their own uſe and for exportation. The gueſts ſat in a circle upon the ground, with a little hay, graſs, or the ſkin of ſome animal under them. A low table or ſtool was ſet before each perſon, with the portion of meat allotted to him upon it. In this diſtribution, they never neglected to ſet the largeſt and beſt pieces before thoſe who were moſt diſtinguiſhed for their rank, their exploits, or their riches. Every gueſt took the meat ſet before him in his hands, and tearing it with his teeth, fed upon it in the beſt manner he could. If any one found difficulty in ſeparating any part of his meat with his hands and teeth, he made uſe of a large knife, that lay in a particular place for the benefit of the whole company. Servants, or young boys and girls, the children of the family, ſtood behind the gueſts ready to help them to drink or any thing they wanted. Feaſt.

As the ancient Britons greatly excelled and very much delighted in muſic, all their feaſts were accompanied with the joys of ſong, and the muſic of harps. In the words of Oſſian †, "whenever the feaſt of ſhells is prepared, the ſongs of bards ariſe. The voice of ſprightly mirth is heard. The trembling harps of joy are ſtrung. They ſing the battles of heroes, or the heaving breaſts of love." Some of the poems of that illuſtrious Britiſh bard appear to have been compoſed in order to be ſung by the hundred bards of Fingal * at the feaſt of Selma. Many of the ſongs of the bards which were ſung and played at the feaſt of the ancient Britons, were of a grave and ſolemn ſtrain, celebrating the brave actions of the gueſts, or of the heroes of other times; but theſe were ſometimes intermixed with more ſprightly and cheerful airs, to which the youth of both ſexes danced, for the entertainment of the company.

† Vol. II. p. 9. Vol. I. p. 37.

* *Ibid.* Vol. I. p. 87, 209.

It has been often obſerved by authors, that there is no nation in the world comes near the Engliſh in the magnificence of their feaſts. Thoſe made at our coronations, inſtalments, conſecrations, &c. tranſcend the belief of all foreigners; and yet it is doubted whether thoſe now in uſe are comparable to thoſe of our forefathers.

William the Conqueror, after he was peaceably ſettled on the throne of England, ſent agents into different countries, to collect the moſt admired and rare diſhes for his table; by which means, ſays John of Saliſbury, this iſland, which is naturally productive of plenty and variety of proviſions, was overflowed with every thing that could inflame a luxurious appetite. The ſame writer tells us, that he was preſent at an entertainment which laſted from three o'clock in the afternoon to midnight; at which delicacies were ſerved up, which had been brought from Conſtantinople, Babylon, Alexandria, Paleſtine, Tripoli, Syria, and Phenicia. Theſe delicacies, we may preſume, were very expenſive. Thomas Becket, if we may believe his hiſtorian Fitz-Stephen, gave L. 5, equivalent to L. 75 at preſent, for one diſh of eels. The ſumptuous entertainments which the kings of England, and of other countries, gave to their nobles and prelates, at the feſtivals of Chriſtmas, Eaſter, and Whitſuntide, in which they ſpent a great part of their revenues, contributed very much to diffuſe a taſte for profuſe and expenſive banqueting. It was natural for a proud and wealthy baron to imitate in his own caſtle the entertainments he had ſeen in the palace of his prince. Many of the clergy too, both ſeculars and regulars, being very rich, kept excellent tables. The monks of St Swithins, at Winchеſter, made a formal complaint to Henry II. againſt their abbot, for taking away three of the 13 diſhes they uſed to have every day at dinner. The monks of Canterbury were ſtill more luxurious: for they had at leaſt 17 diſhes every day, beſides a deſert; and theſe diſhes were dreſſed with ſpiceries and ſauces,

which

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Feaſt. which excited the appetite as well as pleaſed the taſte.

Great men had ſome kinds of proviſions at their tables that are not now to be found in Britain. When Henry II. entertained his own court, the great officers of his army, with all the kings and great men of Ireland, in Dublin, at the feaſt of Chriſtmas, A. D. 1171, the Iriſh princes and chieftains were quite aſtoniſhed at the profuſion and variety of proviſions which they beheld, and were with difficulty prevailed upon by Henry to eat the fleſh of cranes, a kind of food to which they had not been accuſtomed. In the remaining monuments of this period, we meet with the names of ſeveral diſhes, as dellegrout, maupigyrnun, karumpie, &c. the compoſition of which is now unknown.

The coronation-feaſt of Edward III. coſt L. 2835, 18 s. 2 d. equivalent to about L. 40,000 of our money. At the inſtallation of Ralph abbot of St Auguſtine, Canterbury, A. D. 1309, 6000 gueſts were entertained with a dinner, conſiſting of 3000 diſhes, which coſt L. 287 : 5 : 0, equal in efficacy to L. 4300 in our times. "It would require a long treatiſe (ſays Matthew Paris) to deſcribe the aſtoniſhing ſplendor, magnificence, and feſtivity with which the nuptials of Richard Earl of Cornwal and Cincia daughter of Reimund Earl of Provence, were celebrated at London, A. D. 1243. To give the reader ſome idea of it, in a few words, above 30,000 diſhes were ſerved up at the marriage dinner." The nuptials of Alexander III. of Scotland, and the Princeſs Margaret of England, were ſolemnized at York, A. D. 1251, with ſtill greater pomp and profuſion. "If I attempted (ſays the ſame hiſtorian) to diſplay all the grandeur of this ſolemnity,—the numbers of the noble and illuſtrious gueſts,—the richneſs and variety of the dreſſes,—the ſumptuouſneſs of the feaſts,—the multitudes of the minſtrils, mimicks, and others whoſe buſineſs it was to amuſe and divert the company, thoſe of my readers who were not preſent would imagine that I was impoſing upon their credulity. The following particular will enable them to form a judgment of the whole. The archbiſhop of York made the king of England a preſent of 60 fat oxen, which made only one article of proviſion for the marriage-feaſt, and were all conſumed at that entertainment.

The marriage-feaſt of Henry IV. and his queen Jane of Navarre, conſiſted of ſix courſes; three of fleſh and fowls, and three of fiſh. All theſe courſes were accompanied and adorned with *ſuttleties*, as they were called. Theſe *ſuttleties* were figures in paſtry, of men, women, beaſts, birds, &c. placed on the table, to be admired, but not touched. Each figure had a label affixed to it; containing ſome wiſe or witty ſaying, ſuited to the occaſion of the feaſt, which was the reaſon they were called *ſuttleties*. The inſtallation feaſt of George Neville, archbiſhop of York and chancellor of England, exceeded all others in ſplendor and expence, and in the number and quality of the gueſts. The reader may form ſome idea of this enormous feaſt from the following liſt of proviſions prepared for it. In wheat, quarters, 300; in ale, tuns, 300; in wine, tuns, 100; in ipocraſſe, pipes, 1; in oxen, 104; in wild bulls, 6; in muttons, 1000; in veals, 304; in porkes, 304; in ſwanns, 400; in geeſe, 2000; in cappons, 1000; in pigs, 2000; in plovers, 400; in quailes, 1200; in fowls called rees, 2400; in peacocks, 104; in mallards and teales, 4000; in cranes, 204; in kidds, 204; in chickens, 2000; in pigeons, 2000; in connies, 4000; in bittors, 204; in heronſhaws, 400; in pheaſants, 200; in partridges, 500; in woodcocks, 400; in curliews, 100; in egrits, 1000; in ſtaggs, bucks, and roes, 500 and more; in paſties of veniſon, cold, 4000; in parted diſhes of jellies, 1000; in plain diſhes of jellies, 3000; in cold tarts, baked, 4000; in cold cuſtards, baked, 3000; in hot paſties of veniſon, 1500; in hot cuſtards, 2000; in pikes and breams, 308; in porpoiſes and ſeals, 12; ſpices, ſugared delicates, and wafers, plenty. No turkies are mentioned in this enormous bill of fare, becauſe they were not then known in England. Cranes, heronſhaws, porpoiſes, and ſeals, are ſeldom ſeen at modern entertainments.

Feaſt, Feathers.

One of the moſt expenſive ſingularities attending the royal feaſts in thoſe days conſiſted in what they called *intermeats*. Theſe were repreſentations of battles, ſieges, &c. introduced between the courſes, for the amuſement of the gueſts. The French excelled in exhibitions of this kind. At a dinner given by Charles V. of France to the emperor Charles IV. A. D. 1378, the following intermeat was exhibited: A ſhip with maſts, ſails, and rigging, was ſeen firſt: ſhe had for colours the arms of the city of Jeruſalem: Godfrey de Bouillon appeared upon deck, accompanied by ſeveral knights armed cap-a-pee: the ſhip advanced into the middle of the hall, without the machine which moved it being perceptible. Then the city of Jeruſalem appeared, with all its towers lined with Saracens. The ſhip approached the city; the Chriſtians landed, and began the aſſault; the beſieged made a good defence: ſeveral ſcaling-ladders were thrown down; but at length the city was taken. Intermeats at ordinary banquets conſiſted of certain delicate diſhes introduced between the courſes, and deſigned rather for gratifying the taſte than for ſatisfying hunger.

At thoſe feaſts, beſides the ordinary drinks, ale and cyder, there were great quantities of wines of various kinds. Of theſe laſt, the following lines of a poet who wrote in the fourth century, contain an ample enumeration.

Ye ſhall have rumney and maleſpine,
Both ypocraſſe and vernage wyne;
Mountreſe and wyne of Greke,
Both algrade and deſpice eke,
Antioche and baſtarde,
Pyment alſo, and garnarde,
Wyne of Greke and Muſcadell,
Both clare, pymen, and Rochell.

Some of theſe liquors, as ypocraſs, pyment, and claret, were compounded of wine, honey, and ſpices of different kinds, and in different proportions.

FEATHER, in phyſiology, a general name for the covering of birds; it being common to all the animals of this claſs to have their whole body, or at leaſt the greateſt part of it, covered with feathers or plumage. See Ornithology, Sect. I. art. iv.

Feathers make a conſiderable article in commerce, particularly thoſe of the oſtrich, heron, ſwan, peacock, gooſe, &c. for plumes, ornaments of the head, filling of beds, writing-pens, &c.

Geeſe

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Febrifuge || Feciales.

Geese are plucked in some parts of Great Britain five times in the year; and in cold seasons many of them die by this barbarous custom, (see ANAS.)—Those feathers that are brought from Somersetshire are esteemed the best, and those from Ireland the worst.

* See the article *Down.*

Eider down * is imported from Denmark; the ducks that supply it being inhabitants of Hudson's Bay, Greenland, Ireland, and Norway. Our own islands west of Scotland breed numbers of these birds, which turn out a profitable branch of trade to the poor inhabitants. Hudson's Bay also furnishes very fine feathers, supposed to be of the goose kind. The down of the swan is brought from Dantzic. The same place also sends us great quantities of the feathers of the cock and hen. The London poulterers sell a great quantity of the feathers of those birds, and of ducks and turkies: those of ducks being a weaker feather, are inferior to those of the goose; and turkies feathers are the worst of any. The best method of curing feathers is to lay them in a room, in an exposure to the sun; and when dried, to put them in bags, and beat them well with poles to get the dirt off.

FEBRIFUGE, an appellation given to such medicines as mitigate or remove a fever.

FEBRUARY, in chronology, the second month of Numa's year, and under the protection of the god Neptune. This month is not found in the kalendar of Romulus, but was added to the year by Numa. It had its name from *Februa*, *Februaca*, or *Februalis*, all names of Juno, who presided over the purifications of women; and in this month the Lupercalia were held in honour of Juno, and women were purified by the priests of Pan Lyceus at that festival. See LUPERCALIA.

February, in a common year, consists only of 28 days; but in the bissextile year it has 29, on account of the intercalary day added that year.

FECIALES, or FOECIALES, an order of priests or officers, consisting of 20 persons, among the ancient Romans, appointed to proclaim war, negociate peace, &c.

Festus derives the word from *ferio*, "I strike;" as *ferire fœdus* signifies "to conclude a treaty:" and accordingly, instead of *feciales*, he would have it written *feriales*. Others derive it from *fœdus*, which was anciently written *fedus*; or from *fides*, "faith." Others from *facio*, *feci*, "I make," &c. because they made war and peace. Vossius chooses to derive it from *fatu*, of the verb *fari*, "to speak;" in which sense the *feciales* should be the same with *oratores*; which sentiment is also confirmed by the authority of Varro, who says they were called indifferently *feciales* and *oratores*.

The feciales were a sort of heralds, who, when the Romans had any dispute with their neighbours, were sent first to demand the thing pretended to be usurped, or require satisfaction for the injury alleged to be done. If an answer was not returned by them that was satisfactory to the people and the senate, they were dispatched again to declare war, and the like in treating of peace; the feciales being the only persons appointed to negociate between the senate, &c. and the enemy.

Plutarch, in the life of Numa, and Halicarnassæus (*lib.* ii.), observe, that they were first instituted by that prince. The latter adds, that they were chosen out of the best families in Rome; that their office, which was reputed a sort of sacerdotium, or priesthood, only ended with their life; that their persons were sacred and inviolable, as those of other priests; that they were even charged to see the republic did not declare war unjustly; that they were to receive the complaints and remonstrances of nations who pretended to have been any way injured by the Romans; that if those complaints were found just, they were to seize the criminals, and deliver them up to those they had offended; that they were invested with the rights and privileges of ambassaders; that they concluded treaties of peace and alliance, and took care they were executed; and, lastly, abolished them, if they were found not to be equitable. Livy, lib. i. cap. 24. ascribes their institution to Ancus Martius, in the year of Rome 114.—Varro assures us, that in his time most of these functions of the feciales were set aside; though Plutarch observes, that they had still some authority in his time.

Fecundity || Fee.

The feciales were crowned with *verbena*, "vervain," when they went to declare war. Their head was covered with a veil, over which the crown was applied. In this equipage they proceeded to the frontiers of the new enemy's country, and threw a bloody dart or javelin into the ground within the same. In Livy and other ancient authors we have the formula used in such declarations.

FECUNDITY, the same with FERTILITY.

FEE, in law, signifies a complete feudal property. Hence, where the bare liferent of any feudal subject is meant to be conveyed to A, and the absolute property to B, that meaning is expressed thus; "to A in liferent, and to B in fee." See LAW, N° lxix. clxiv.

Fees are commonly divided into *absolute*, otherwise called fees-simple; and *limited*, one species of which we usually call fee-tail.

I. Tenant in fee-simple (or, as he is frequently styled, *tenant in fee*), is he that hath lands, tenements, or hereditaments, to hold to him and his heirs for ever; generally, absolutely, and simply; without mentioning what heirs, but referring that to his own pleasure, or to the disposition of the law. The true meaning of the word *fee* (*feodum*) is the same with that of *feud* or *fief*†, and in its original sense it is taken in contradistinction to *allodium*; which latter the writers on this subject define to be every man's own land, which he possesseth merely in his own right, without owing any rent or service to any superior. This is property in its highest degree; and the owner thereof hath *absolutum et directum dominium*, and therefore is said to be seised thereof absolutely *in dominico suo*, in his own demesne. But *feodum*, or *fee*, is that which is held of some superior, on condition of rendering him service; in which superior the ultimate property of the land resides. And therefore Sir Henry Spelman defines a feud or fee to be, The right which the vassal or tenant hath in lands to use the same, and take the profits thereof to him and his heirs, rendering to the lord his due services; the mere allodial property of the soil always remaining in the lord. This allodial property no subject in Britain has; it being a received and now undeniable principle in the law, that all the lands are holden mediately or immediately of the king. The king therefore only hath *absolutum et directum dominium*; but all subjects lands are in the nature of *feodum* or *fee*, whether derived to them by descent from their ancestors, or purchased for a valuable consideration: for they cannot

Blackst. Comment.

† See *Feudal System.*

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Fee. not come to any man by either of thoſe ways, unleſs accompanied with thoſe feodal clogs which were laid upon the firſt feudatory when it was originally granted. A ſubject therefore hath only the uſufruct, and not the abſolute property, of the ſoil; or, as Sir Edward Coke expreſſes it, he hath *dominium utile*, but not *dominium directum*. And hence it is, that, in the moſt ſolemn acts of law, we expreſs the ſtrongeſt and higheſt eſtate that any ſubject can have, by theſe words, "he is ſeiſed thereof *in his demeſne*, as of fee." It is a man's demeſne, *dominium*, or property, ſince it belongs to him and his heirs for ever: yet this *dominium*, property, or demeſne, is ſtrictly not abſolute or allodial, but qualified or feodal: it is in his demeſne, *as of fee;* that is, it is not purely and ſimply his own, ſince it is held of a ſuperior lord, in whom the ultimate property reſides.

This is the primary ſenſe and acceptation of the word *fee*. But (as Sir Martin Wright very juſtly obſerves) the doctrine, "that all lands are *holden*," having been for ſo many ages a fixed and undeniable axiom, the Engliſh lawyers do very rarely (of late years eſpecially) uſe the word *fee* in this its primary original ſenſe, in contradiſtinction to *allodium* or abſolute property, with which they have no concern; but generally uſe it to expreſs the continuance or quantity of eſtate. A *fee* therefore, in general, ſignifies an eſtate of inheritance; being the higheſt and moſt extenſive intereſt that a man can have in a feud: and when the term is uſed ſimply, without any other adjunct, or has the adjunct of *ſimple* annexed to it (as, a fee, or a fee-ſimple), it is uſed in contradiſtinction to a fee-conditional at the common law, or a fee-tail by the ſtatute; importing an abſolute inheritance, clear of any condition, limitation, or reſtrictions to particular heirs, but deſcendible to the heirs-general, whether male or female, lineal or collateral. And in no other ſenſe than this is the king ſaid to be ſeiſed in fee, he being the feudatory of no man.

Taking therefore *fee* in this its ſecondary ſenſe, as a ſtate of inheritance, it is applicable to, and may be had in, any kind of hereditaments either corporeal or incorporeal. But there is this diſtinction between the two ſpecies of hereditaments; that of a corporeal inheritance a man ſhall be ſaid to be ſeiſed *in his demeſne, as of fee;* of an incorporeal one he ſhall only be ſaid to be ſeiſed *as of fee*, and not *in his demeſne*. For as incorporeal hereditaments are in their nature collateral to, and iſſue out of, lands and houſes, their owner hath no property, *dominium*, or demeſne, in the *thing* itſelf, but hath only ſomething derived out of it; reſembling the *ſervitutes*, or ſervices, of the civil law. The *dominium*, or property, is frequently in one man, while the appendage or ſervice is in another. Thus Gaius may be ſeiſed *as of fee*, of a way going over the land, of which Titius is ſeiſed *in his demeſne as of fee*.

The fee ſimple or inheritance of lands and tenements is generally veſted and reſides in ſome perſon or other; though divers inferior eſtates may be carved out of it. As if one grants a leaſe for 21 years, or for one or two lives, the fee-ſimple remains veſted in him and his heirs; and after the determination of thoſe years or lives, the land reverts to the granter or his heirs, who ſhall hold it again in fee-ſimple. Yet ſometimes the fee may be in *abeyance*, that is (as the word ſignifies) in expectation, remembrance, and contemplation in law; there being no perſon *in eſſe*, in whom it can veſt and abide, though the law conſiders it as always potentially exiſting, and ready to veſt whenever a proper owner appears. Thus, in a grant to John for life, and afterwards to the heirs of Richard, the inheritance is plainly neither granted to John nor Richard, nor can it veſt in the heirs of Richard till his death, *nam nemo eſt hæres viventis:* it remains therefore in waiting, or abeyance, during the life of Richard. This is likewiſe always the caſe of a parſon of a church, who hath only an eſtate therein for the term of his life; and the inheritance remains in abeyance. And not only the fee, but the freehold alſo, may be in abeyance; as, when a parſon dies, the freehold of his glebe is in abeyance until a ſucceſſor be named, and then it veſts in the ſucceſſor. Fee.

The word *heirs* is neceſſary in the grant or donation, in order to make a fee or inheritance. For if land be given to a man for ever, or to him and his aſſigns for ever, this veſts in him but an eſtate for life. This very great nicety about the inſertion of the word *heirs* in all feoffments and grants, in order to veſt a fee, is plainly a relic of the feodal ſtrictneſs: by which it was required, that the form of the donation ſhould be punctually purſued; or that, as Craig expreſſes it, in the words of Baldus, *donationes ſint ſtricti juris, ne quis plus donaſſe præſumatur quam in donatione expreſſerit*. And therefore, as the perſonal abilities of the donee were originally ſuppoſed to be the only inducements to the gift, the donee's eſtate in the land extended only to his own perſon, and ſubſiſted no longer than his life; unleſs the donor, by an expreſs proviſion in the grant, gave it a longer continuance, and extended it alſo to his heirs. But this rule is now ſoftened by many exceptions.

For, 1. It does not tend to deviſes by will; in which, as they were introduced at the time when the feodal rigour was apace wearing out, a more liberal conſtruction is allowed: and therefore by a deviſe to a man for ever, or to one and his aſſigns for ever, or to one in fee-ſimple, the deviſee hath an eſtate of inheritance; for the intention of the deviſor is ſufficiently plain from the words of perpetuity annexed, though he hath omitted the legal words of inheritance. But if the deviſe be to a man and his aſſigns, without annexing words of perpetuity, there the deviſee ſhall take only an eſtate for life; for it does not appear that the deviſor intended any more. 2. Neither does this rule extend to fines or recoveries, conſidered as a ſpecies of conveyance; for thereby an eſtate in fee paſſes by act and operation of law without the word *heirs*: as it does alſo, for particular reaſons, by certain other methods of conveyance, which have relation to a former grant or eſtate, wherein the word *heirs* was expreſſed. 3. In creations of nobility by writ, the peer ſo created hath an inheritance in his title, without expreſſing the word *heirs*; for they are implied in the creation, unleſs it be otherwiſe ſpecially provided: but in creations by patent, which are *ſtricti juris*, the word *heirs* muſt be inſerted, otherwiſe there is no inheritance. 4. In grants of lands to ſole corporations and their ſucceſſors, the word *ſucceſſors* ſupplies the place of *heirs*; for as heirs take from the anceſtor, ſo doth the ſucceſſor from the predeceſſor. Nay, in a grant to a biſhop, or other ſole ſpiritual corporation, in *frankalmoign*, the word *frankalmoign* ſupplies the place of *ſucceſſors* (as the word *ſucceſſors* ſupplies the place of

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Fee. *heirs*) *ex vi termini*; and in all these cases a fee-simple vests in such sole corporation. But, in a grant of lands to a corporation aggregate, the word *successors* is not necessary, though usually inserted: for, albeit such simple grant be strictly only an estate for life, yet as that corporation never dies, such estate for life is perpetual, or equivalent to a fee-simple, and therefore the law allows it to be one. Lastly, in the case of the king, a fee-simple will vest in him, without the word *heirs* or *successors* in the grant; partly from prerogative royal, and partly from a reason similar to the last, because the king, in judgment of law, never dies. But the general rule is, that the word *heirs* is necessary to create an estate of inheritance.

II. We are next to consider limited fees, or such estates of inheritance as are clogged and confined with conditions or qualifications of any sort. And these we may divide into two sorts: 1. *Qualified*, or *base* fees; and, 2. Fees *conditional*, so called at the common law; and afterwards fees-*tail*, in consequence of the statute *de donis*.

1. A BASE or qualified fee, is such a one as has a qualification subjoined thereto, and which must be determined whenever the qualification annexed to it is at an end. As, in the case of a grant to A and his heirs, tenants in the manor of Dale; in this instance, whenever the heirs of A cease to be tenants of that manor, the grant is entirely defeated. So, when Henry VI. granted to John Talbot, lord of the manor of Kingston-Lisle in Berks, that he and his heirs, lords of the said manor, should be peers of the realm, by the title of *barons of Lisle*; here John Talbot had a base or qualified fee in that dignity; and the instant he or his heirs quitted the seigniory of this manor, the dignity was at an end. This estate is a fee, because by possibility it may endure for ever in a man and his heirs; yet as that duration depends upon the concurrence of collateral circumstances, which qualify and debase the purity of the donation, it is therefore a qualified or base fee.

2. As to fees-*conditional*, or fees-*tail*, see the article TAIL.

FEE also signifies a certain allowance to physicians, barristers, attornies, and other officers, as a reward for their pains and labour.

If a person refuse to pay an officer his due fees, the court will grant an attachment against him, to be committed till the fees are paid; and an attorney may bring an action of the case for his fees against the client that retained him in his cause.

FEE also denotes a settled perquisite of public officers, payable by those who employ them.

The fees due to the officers of the custom-house, are expressly mentioned in a schedule, or table, which is hung up in public view in the said office, and in all other places where the said fees are to be paid or received. And if any officer shall offend, by acting contrary to the regulations therein contained, he shall forfeit his office and place, and be for ever after incapable of any office in the custom-house.

The other public offices have likewise their settled fees, for the several branches of business transacted in them.

FEE-*Farm*, a kind of tenure without homage, fealty, or other service, except that mentioned in the feoffment; which is usually the full rent, or at least a fourth part of it. Feelers ‖ Felis.

The nature of this tenure is, that if the rent be behind, and unpaid for two years, then the feoffor and his heirs may have an action for the recovery of the lands.

FEELERS, in natural history, a name used by some for the horns of INSECTS.

FEELING, one of the five external senses, by which we obtain the ideas of solid, hard, soft, rough, hot, cold, wet, dry, and other tangible qualities. See ANATOMY, n° 138.

FEET. See FOOT.

Feet-Bearer, the name of an officer in the courts of the ancient Anglo-Saxon and Welch kings. He was a young gentleman whose duty it was to sit on the floor, with his back towards the fire, and hold the king's feet in his bosom all the time he sat at table, to keep them warm and comfortable†: A piece of state and luxury unknown in modern times. † *Leges Walliæ*, p. 58.

FEINT, in fencing, a show of making a thrust at one part, in order to deceive the enemy, that you may really strike him in another.

A simple feint is a mere motion of the wrist, without stirring the foot.

FELAPTON, in logic, one of the six first modes of the third figure of syllogisms; whereof the first proposition is an universal negative, the second an universal affirmative, and the third a particular negative.

FELIBIEN (Andre), was born at Chartres in 1619, and went secretary under the marquis de Fontenay Mareuil ambassador to the court of Rome in 1647. On his return, M. Colbert procured him the places of historiagrapher to the king, superintendant of his buildings, and of the arts and manufactures in France. He became afterwards deputy comptroller-general of the bridges and dykes in that kingdom; and died in 1695. He wrote several pieces relating to the fine arts; the principal of which is his "Dialogues on the lives and works of the most eminent painters."

FELICITAS, (FELICITY, or *Happiness*), was deified by the ancient Pagans. Lucullus built a temple to her. She had another erected by Lepidus. The Greeks paid divine worship to *Macaria*, daughter of Hercules, the same with *Felicitas*. This deity is often pictured upon medals, and generally with a Cornucopia in one hand and a Caduceus in the other. The inscriptions are, *Felicitas Temporum*, *Felicitas Augusti*, *Felicitas Publica*, &c.

FELIS, in zoology, a genus of quadrupeds belonging to the order of feræ, the characters of which are these: The fore-teeth are equal; the molares or grinders have three points; the tongue is furnished with rough sharp prickles, and pointing backwards; and the claws are sheathed and retractile. This genus comprehends twenty-one species, *viz.* See Plates CXCI. and CXCII.

1. The *Leo*, or LION. The largest lions are from eight to nine feet in length, and from four to six feet high: those of a smaller size are generally about 5½ feet long, and about 3½ high. His head is very thick, and his face is beset on all sides with long bushy yellowish hair; this shaggy hair extends from the top of the head to below the shoulders, and hangs down to his knees: the belly and breast are likewise covered with long Lion.

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Felis. long hair. The reſt of the body is covered with very ſhort hair, excepting a buſh at the point of the tail. The ears are roundiſh, ſhort, and almoſt entirely concealed under the hair of his front. The ſhagginess of the fore-part of his body makes the hinder-part have a naked appearance. The tail is long and very ſtrong; the legs are thick and fleſhy; and the feet are ſhort; the length of the claws is about an inch and a quarter, are of a whitiſh colour, very crooked, and can be extended or retracted into the membranous ſheath at pleaſure: their points are ſeldom blunted, as they are never extended but when he ſeizes his prey.

The female, or lionneſs, has no mane, or long hair about her head or ſhoulders; in her we ſee diſtinctly the whole face, head, ears, neck, ſhoulders, breaſt, &c. all theſe parts being in ſome meaſure concealed under the long hair of the male, give the female a very different appearance: beſides, ſhe is conſiderably leſs than the male. The hair of both male and female is of a yellowiſh colour, and whitiſh on the ſides and belly.

In warm countries, quadrupeds in general are larger and ſtronger than in the cold or temperate climates. They are likewiſe more fierce and hardy; all their natural qualities ſeem to correſpond with the ardour of the climate. The lions nouriſhed under the ſcorching ſun of Africa or the Indies, are the moſt ſtrong, fierce, and terrible. Thoſe of mount Atlas, whoſe top is ſometimes covered with ſnow, are neither ſo ſtrong nor ſo ferocious as thoſe of Biledulgerid or Zaara, whoſe plains are covered with burning ſand. It is in theſe hot and barren deſarts, that the lion is the dread of travellers, and the ſcourge of the neighbouring provinces. But it is a happy circumſtance that the ſpecies is not very numerous: they even appear to diminiſh daily. The Romans, ſays Mr Shaw, brought many more lions out of Libya for their public ſhows, than are now to be found in that country. It is likewiſe remarked, that the lions in Turky, Perſia, and the Indies, are leſs numerous than formerly. As this formidable and courageous animal makes a prey of moſt other animals, and is himſelf a prey to none, this diminution in the number of the ſpecies can be owing to nothing but an increaſe in the number of mankind: for it muſt be acknowledged, that the ſtrength of this king of animals is not a match for the dexterity and addreſs of a negro or Hottentot, who will often dare to attack him face to face, and with very ſlight weapons.

The ingenuity of mankind augments with their number; that of other animals continues always the ſame. All the noxious animals, as the lion, are reduced to a ſmall number, not only becauſe mankind are become more numerous, but likewiſe becauſe they have become more ingenious, and have invented weapons which nothing can reſiſt. This ſuperiority in the numbers and induſtry of mankind, at the ſame time that it has broke the vigour of the lion, ſeems likewiſe to have enervated his courage. This quality, though natural, is exalted or lowered according to the good or bad ſucceſs with which any animal has been accuſtomed to employ his force. In the vaſt deſarts of Zaara; in thoſe which ſeem to ſeparate two very different races of men, the Negroes and Moors, between Senegal and the boundaries of Mauritania; in thoſe uninhabited regions above the country of the Hottentots; and, in general, all the meridional parts of Africa and Aſia, where mankind have diſdained to dwell, lions are ſtill as numerous and as ferocious as ever. Accuſtomed to meaſure their ſtrength by that of all other animals which they encounter, the habit of conquering renders them haughty and intrepid. Having never experienced the ſtrength of man, or the power of his arms, inſtead of diſcovering any ſigns of fear, they diſdain and ſet him at defiance. Wounds irritate, but do not terrify them: they are not even diſconcerted at the ſight of numbers. A ſingle lion of the deſart has been known to attack a whole caravan; and if, after a violent and obſtinate engagement, he found himſelf weakened, he retreats fighting, always keeping his face to the enemy. On the other hand, the lions which live near the villages or huts of the Indians or Africans, being acquainted with man and the force of his arms, are ſo daſtardly as to fly and leave their prey at the ſight of women or children.

This ſoftening in the temper and diſpoſition of the lion, ſhows that he is capable of culture, and ſuſceptible, at leaſt to a certain degree, of the impreſſions that he receives: accordingly, hiſtory informs us of lions yoked in triumphal chariots, trained to war, or the chace; and that, faithful to their maſters, they never employed their ſtrength or courage but againſt their enemies. It is certain, that a lion taken young, and brought up among domeſtic animals, will eaſily be accuſtomed to live and ſport with them; that he is mild and careſſing to his maſter, eſpecially when he is young; and that, if his natural ferocity ſometimes breaks out, it is rarely turned againſt thoſe who have been kind to him. But, as his paſſions are impetuous and vehement, it is not to be expected that the impreſſions of education will at all times be ſufficient to balance them: for this reaſon it is dangerous to let him ſuffer hunger long, or to vex him by ill-timed teazings: bad treatment not only irritates him, but he remembers it long, and meditates revenge. On the other hand, he is exceedingly grateful, and ſeldom forgets benefits received. He has been often obſerved to diſdain weak or inſignificant enemies, to deſpiſe their inſults, and to pardon their offenſive liberties. When led into captivity, he will diſcover ſymptoms of uneaſineſs, without anger or peeviſhneſs: on the contrary, his natural temper ſoftens, he obeys his maſter, careſſes the hand that gives him food, and ſometimes gives life to ſuch animals as are thrown to him alive for prey: by this act of generoſity he ſeems to conſider himſelf as for ever bound to protect them; he lives peaceably with them; allows them a part, and ſometimes the whole, of his food; and will rather ſubmit to the pangs of hunger, than fill his ſtomach with the fruit of his beneficence. We may likewiſe obſerve, that the lion is not a cruel animal: he kills rather from neceſſity than choice, never deſtroying more than he eats; and whenever his appetite is ſatisfied, he is mild and peaceable. For his ordinary ſubſiſtence, he requires about 15 pounds of raw fleſh each day.

The aſpect of the lion correſponds with the noble and generous qualities of his mind. His figure is reſpectable; his looks are determined; his gait is ſtately, and his voice tremendous. In a word, the body of the lion appears to be the beſt model of ſtrength

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Felis. joined to agility. The force of his muſcles is expreſſed by his prodigious leaps and bounds, often 20 feet at once; by the briſk motion of his tail, a ſingle ſweep of which is ſufficient to throw a man to the ground; by the eaſe with which he moves the ſkin of his face, and particularly of his forehead; and, laſtly, by the faculty of erecting and agitating the hair of his mane when irritated.

Lions are very ardent in their amours: when the female is in ſeaſon, ſhe is often followed by eight or ten males, who roar inceſſantly, and enter into furious engagements, till one of them completely overcomes the reſt, takes peaceable poſſeſſion of the female, and carries her off to ſome ſecret receſs. The lionneſs brings forth her young in the ſpring, and produces but once every year.

All the paſſions of the lion, the ſoft paſſion of love not excepted, are exceſſive; the love of offspring is extreme: the lionneſs is naturally weaker, leſs bold, and more gentle than the lion; but ſhe becomes perfectly rapacious and terrible when ſhe has young Then ſhe exhibits more courage than the male; ſhe regards no danger; ſhe attacks indifferently men and all other animals, kills them, and carries them to her young ones, whom ſhe thus early inſtructs to ſuck their blood and tear their fleſh. She generally brings forth in the moſt ſecret and inacceſſible places; and, when afraid of a diſcovery, ſhe endeavours to conceal the traces of her feet, by returning frequently on her ſteps, or rather by effacing them with her tail; and, when the danger is great, ſhe carries off her young, and conceals them ſomewhere elſe. But, when an actual attempt is made to deprive her of her young, ſhe becomes perfectly furious, and defends them till ſhe be torn to pieces.

The lion ſeldom goes abroad in the middle of the day; but ſallies forth in the evening and night in queſt of prey. He is afraid of fire, and ſeldom or never approaches the artificial fires made by the ſhepherds for the protection of their flocks; he does not trace other animals by the ſcent, but is obliged to truſt to his eyes. Many hiſtorians have even miſrepreſented him as incapable of finding out his prey; but that he is obliged to the jackal, an animal of exquiſite ſcent, in order to provide for him, and that this animal either accompanies or goes before him for this purpoſe. The jackal is a native of Arabia, Libya, &c. and, like the lion, lives upon prey: perhaps ſometimes he follows the lion, but it is with a view to pick up what he leaves behind, not to provide for him; for, being a ſmall and feeble animal, he ought rather to fly from than to ſerve the lion.

The lion, when hungry, will attack any animal that preſents itſelf: but he is ſo very formidable, that all endeavour to avoid his rencounter; this circumſtance often obliges him to conceal himſelf, and lie in wait till ſome animal chances to paſs. He lies ſquat on his belly in a thicket; from which he ſprings with ſuch force and velocity, that he often ſeizes them at the firſt bound. He endures hunger longer than thirſt; he ſeldom paſſes water without drinking, which he does by lapping like a dog. In burning deſarts, where rivers and fountains are denied, they live in a perpetual fever, a ſort of madneſs fatal to every animal they meet with. The author of the *Oeconomy of Nature* Felis. gives a wonderful proof of the inſtinct of theſe animals in thoſe unwatered tracts. There the pelican makes her neſt; and in order to cool her young ones, and accuſtom them to an element they muſt afterwards be converſant in, brings from afar, in their great gular pouch, ſufficient water to fill the neſt: the lion, and other wild beaſts, approach and quench their thirſt; yet never injure the unfledged birds, as if conſcious that their deſtruction would immediately put a ſtop to thoſe grateful ſupplies.

The roaring of the lion, which is ſtrong and loud, is his ordinary voice; but when he is irritated, his cry is ſhorter, repeated more ſuddenly, and is ſtill more terrible than the roaring: beſides, he beats his ſides with his tail, ſtamps with his feet, erects and agitates the hair of his head and mane, moves the ſkin of his face, ſhows his angry teeth, and lolls out his tongue.

The roaring of the lion, according to Mr Sparman, "conſiſts in a hoarſe inarticulate ſound, which at the ſame time ſeems to have a hollowneſs in it, ſomething like that proceeding from a ſpeaking trumpet. The ſound is between that of a German *u* and an *o*, being drawn to a great length, and appearing as if it came from out of the earth; at the ſame time that, after liſtening with the greateſt attention, I could not exactly hear from what quarter it came. The ſound of the lion's voice does not bear the leaſt reſemblance to thunder, as M. de Buffon, tom. ix. p. 22. from the Voyage of Boullaye le Gouz, affirms it does. In fact, it appeared to me to be neither peculiarly piercing nor tremendous; yet, from its ſlow prolonged note, joined with nocturnal darkneſs, and the terrible idea one is apt to form to one's ſelf of this animal, it made one ſhudder, even in ſuch places as I had an opportunity of hearing it in with more ſatisfaction, and without having the leaſt occaſion for fear. We could plainly perceive by our cattle when the lions, whether they roared or not, were reconnoitring us at a ſmall diſtance. For in that caſe the hounds did not dare to bark in the leaſt, but crept quite cloſe to the Hottentots; and our oxen and horſes ſighed deeply, frequently hanging back, and pulling ſlowly with all their might at the ſtrong ſtraps with which they were tied up to the waggon. They likewiſe laid themſelves down upon the ground and ſtood up alternately, appearing as if they did not know what to do with themſelves: or rather juſt as if they were in the agonies of death. It is, indeed, a wonderful circumſtance (continues our author), that the brute creation ſhould have been taught merely by nature to be in dread of the lion; for our horſes and oxen were all from places where I am certain they could have no knowledge of this dreadful adverſary of theirs; ſo that in this we muſt admire the bounty of Providence, which, while it has ſent ſuch a tyrant as the lion amongſt the animal creation, has likewiſe taught them to diſcern and diſtinguiſh it with trembling and horror."

The gait of the lion is ſtately, grave, and ſlow, tho' always in an oblique direction. His movements are not equal or meaſured, but conſiſt of leaps and bounds; which prevents him from ſtopping ſuddenly, and makes him often overleap his mark. When he leaps upon his

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Felis

his prey, he makes a bound of 12 or 15 feet, falls above it, ſeizes it with his fore-feet, tears the fleſh with his claws, and then devours it with his teeth. If he chances to miſs his leap, he will not, as the Hottentots unanimouſly aſſured Mr Sparman, follow his prey any farther; but, as though he were aſhamed, turning round towards the place where he lay in ambuſh, ſlowly, and ſtep by ſtep, as it were, meaſures the exact length between the two points, in order to find how much too ſhort of, or beyond, the mark he had taken his leap.

One would ſuppoſe that the roaring of the lion would prove ſerviceable to the other animals, as being a warning for them to betake themſelves to flight; but as when he roars, according to all report, he puts his mouth to the ground, ſo that the ſound is diffuſed equally all over the place, without, as we have already mentioned, its being poſſible to hear from what quarter it comes, the animals are intimidated and ſcared to ſuch a degree, as to fly about backwards and forwards in the dark to every ſide; in conſequence of which, they often chance to run on to the very ſpot from whence the ſound actually proceeds, and which they meant moſt to avoid.

Dr Sparman, in his account of the lion, detracts conſiderably from the character of courage and generoſity generally aſcribed to that animal. "It is not in magnanimity (ſays he), as many will have it to be, but in an inſidious and cowardly diſpoſition, blended with a certain degree of pride, that the general character of the lion conſiſts; though hunger muſt naturally have the effect of now and then inſpiring ſo ſtrong and nimble an animal with uncommon intrepidity and courage. Moreover, being accuſtomed always itſelf to kill its own food, and that with the greateſt eaſe, as meeting with no reſiſtance, and even frequently to devour it reeking and weltering in its blood, it cannot but be eaſily provoked, and acquire a greater turn for cruelty than for generoſity: but, on the other hand, not being accuſtomed to meet with any reſiſtance, it is no wonder that, when it does, it ſhould ſometimes be faint-hearted and creſt-fallen. A yeoman, a man of veracity (Jacob Kok, of Zeekoe-river), related to me an adventure he had in theſe words:—One day walking over his lands with his loaded gun, he unexpectedly met with a lion. Being an excellent ſhot, he thought himſelf pretty certain, in the poſition he was in, of killing it, and therefore fired his piece. Unfortunately he did not recollect, that the charge had been in it for ſome time, and conſequently was damp; ſo that his piece hung fire, and the ball falling ſhort, entered the ground cloſe to the lion. In conſequence of this he was ſeized with a panic, and took directly to his feet; but being ſoon out of breath, and cloſely purſued by the lion, he jumped up on a little heap of ſtones, and there made a ſtand, preſenting the butt end of his gun to his adverſary, fully reſolved to defend his life as well as he could to the utmoſt. My friend did not take upon him to determine, whether this poſition and manner of his intimidated the lion or not: it had, however, ſuch an effect upon the creature, that it likewiſe made a ſtand; and what was ſtill more ſingular, laid itſelf down at the diſtance of a few paces from the heap of ſtones ſeemingly quite unconcerned. The ſportſman, in the mean while, did not dare to ſtir a ſtep from the ſpot: beſides, in his flight, he had the misfortune to loſe his powder-horn. At length, after waiting a good half hour, the lion roſe up, and at firſt went very ſlowly, and ſtep by ſtep, as if it had a mind to ſteal off; but as ſoon as it got to a greater diſtance, it began to bound away at a great rate."

Our author alſo relates the following occurrence, as ſerving to ſhow the cowardice and inſidious diſpoſition of the lion. "An elderly Hottentot in the ſervice of a Chriſtian, near the upper part of Sunday river on the Cambdebo ſide, perceived a lion following him at a great diſtance for two hours together. Thence he naturally concluded, that the lion only waited for the approach of darkneſs, in order to make him his prey: and in the mean time, could not expect any other than to ſerve for this fierce animal's ſupper, inaſmuch as he had no other weapon of defence than a ſtick, and knew that he could not get home before it was dark. But as he was well acquainted with the nature of the lion, and the manner of its ſeizing upon its prey, and at the ſame time had leiſure between whiles to ruminate on the ways and means in which it was moſt likely that his exiſtence would be put an end to, he at length hit on a method of ſaving his life. For this purpoſe, inſtead of making the beſt of his way home, he looked out for a *kilpkrans* (ſo they generally call a rocky place level and plain at top, and having a perpendicular precipice on one ſide of it), and ſitting himſelf down on the edge of one of theſe precipices, he found, to his great joy, that the lion likewiſe made a halt, and kept the ſame diſtance as before. As ſoon as it grew dark, the Hottentot ſliding a little forwards, let himſelf down below the upper edge of the precipice upon ſome projecting part or cleft of the rock, where he could juſt keep himſelf from falling. But in order to cheat the lion ſtill more, he ſet his hat and cloak on the ſtick, making with it at the ſame time a gentle motion juſt over his head, and a little way from the edge of the mountain. This crafty expedient had the deſired ſucceſs. He did not ſtay long in that ſituation, before the lion came creeping ſoftly towards him like a cat, and miſtaking the ſkin-cloak for the Hottentot himſelf, took his leap with ſuch exactneſs and preciſion, as to fall headlong down the precipice, directly cloſe to the ſnare which had been ſet up for him; when the Hottentot is ſaid, in his great joy, exultingly to have called out *t'kaiſi!* an interjection of very extenſive import and ſignification."

This is not the only inſtance of lions in Africa being enſnared in the midſt of their leap. In the outhouſes and waſte grounds about farms, where a lion has been upon the watch for ſome animal and miſſed it, or where they have other reaſons to expect him, they ſet up the figure of a man cloſe by the ſide of ſeveral loaded guns; ſo that theſe diſcharge themſelves into the body of the beaſt at the very inſtant that he ſprings or throws himſelf upon the dreſſed figure. As this is done with ſo much eaſe and ſucceſs, and as they hardly ever think it worth while in Africa to take lions alive, they ſeldom give themſelves the trouble of catching them by means of pit-falls.

"It is ſingular (Dr Sparman remarks), that the lion, which, according to many, always kills his prey immediately if it belongs to the brute creation, is reported frequently, although provoked, to content himſelf

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Felis. self with merely wounding the human ſpecies; or at leaſt to wait ſome time before he gives the fatal blow to the unhappy victim he has got under him. In ſeveral places through which I paſſed, they mentioned to me by name a father and his two ſons, who were ſaid to be ſtill living, and who being on foot near a river on their eſtate in ſearch of a lion, this latter had ruſhed out upon them, and thrown one of them under feet: the two others, however, had time enough to ſhoot the lion dead upon the ſpot, which had lain almoſt acroſs the youth ſo nearly and dearly related to them, without having done him any particular hurt. I myſelf ſaw, near the upper part of Duyven-hoek-river, an elderly Hottentot, who at that time (his wounds being ſtill open) bore under one eye and underneath his cheek-bone the ghaſtly marks of the bite of a lion, which did not think it worth his while to give him any other chaſtiſement for having, together with his maſter (whom I alſo knew) and ſeveral other Chriſtians, hunted him with great intrepidity, though without ſucceſs. The converſation ran every where in this part of the country upon one Bota, a farmer and captain in the militia, who had lain for ſome time under a lion, and had received ſeveral bruiſes from the beaſt, having been at the ſame time a good deal bitten by him in one arm, as a token to remember him by; but, upon the whole, had in a manner had his life given him by this noble animal. The man was ſaid then to be living in the diſtrict of Artaquas-kloof. I do not rightly know how to account for this merciful diſpoſition towards mankind. Does it proceed from the lion's greater reſpect and veneration for man, as being equal to, or even a mightier tyrant than, himſelf among the animal creation? or is it merely from the ſame caprice which has ſometimes induced him not only to ſpare the lives of men or brute creatures who have been given up to him for prey, but even to careſs them, and treat them with the greateſt kindneſs? Whims and freaks of this kind have perhaps in a great meaſure acquired the lion the reputation it has for generoſity; but I cannot allow this ſpecious name, ſacred only to virtue, to be laviſhed upon a wild beaſt. Slaves, indeed, and wretches of ſervile minds, are wont with this attribute to flatter their greateſt tyrants; but with what ſhow of reaſon can this attribute be beſtowed upon the moſt powerful tyrant among quadrupeds, becauſe it does not exerciſe an equal degree of cruelty upon all occaſions? That the lion does not, like the wolf, tiger, and ſome other beaſts of prey, kill a great deal of game or cattle at one time, perhaps proceeds from this, that while he is employed in attacking one or two of them, the remainder fly farther than it accords with the natural indolence of this beaſt to follow them. If this be called *generoſity*, a cat may be ſtyled generous with reſpect to the rats; as I have ſeen this creature in the fields among a great number of the latter, where ſhe could have made a great havock at once, ſeize on a ſingle one only, and run off with it. The lion and the cat, likewiſe, very much reſemble each other, in partly ſleeping out, and partly paſſing away in a quiet inactive ſtate, a great part of their time, in which hunger does not urge them to go in queſt of their prey."

The lion's ſtrength, as already obſerved, is very great. Mr Sparman informs us, that "this animal was once ſeen at the Cape to take an heifer in his mouth, and though the legs of this latter dragged on the ground, yet ſeemed to carry her off with the ſame eaſe as a cat does a rat. It likewiſe leaped over a broad dike with her, without the leaſt difficulty. A buffalo perhaps would be too cumberſome for this beaſt of prey, notwithſtanding his ſtrength, to ſeize and carry off with him in the manner above mentioned. Two yeomen, upon whoſe veracity I can place ſome confidence, gave me the following account relative to this matter. Being a hunting near Boſhieſman-river with ſeveral Hottentots, they perceived a lion dragging a buffalo from the plain to a neighbouring woody hill. They, however, ſoon forced it to quit its prey, in order to make a prize of it themſelves; and found that this wild beaſt had had the ſagacity to take out the buffalo's large and unwieldy entrails in order to be able the eaſier to make off with the fleſhy and more eatable part of the carcaſe. The lion's ſtrength, however, is ſaid not to be ſufficient alone to get the better of ſo large and ſtrong an animal as the buffalo; but, in order to make it his prey, this fierce creature is obliged to have recourſe both to agility and ſtratagem; inſomuch, that ſtealing on the buffalo, it faſtens with both its paws upon the noſtrils and mouth of the beaſt, and keeps ſqueezing them cloſe together, till at length the creature is ſtrangled, wearied out, and dies. A certain coloniſt, according to report, had had an opportunity of ſeeing an attack of this kind; and others had reaſon to conclude, that ſomething of this nature had paſſed, from ſeeing buffaloes, which had eſcaped from the clutches of lions, and bore the marks of the claws of theſe animals about their mouth and noſe. They aſſerted, however, that the lion itſelf riſked its life in ſuch attempts, eſpecially if any other buffalo was at hand to reſcue that which was attacked. It was ſaid, that a traveller once had an opportunity of ſeeing a female buffalo with her calf, defended by a river at her back, keep for a long time at bay five lions which had partly ſurrounded her; but did not, at leaſt as long as the traveller looked on, dare to attack her. I have been informed, from very good authority, that on a plain to the eaſt of Kromme-river, a lion had been gored and trampled to death by a herd of cattle; having, urged probably by hunger, ventured to attack them in broad day-light." This the reader will, perhaps, not ſo much wonder at, when he is told, that in the day-time, and upon an open plain, 12 or 16 dogs will eaſily get the better of a large lion. Nor is there any neceſſity, Dr Sparman ſays, for the dogs with which the lion is to be hunted to be very large and trained up to the ſport, as M. Buffon thinks they ſhould be, the buſineſs being perfectly well accompliſhed with the common farm-houſe dogs. When theſe have got pretty near the lion, the latter, from a greatneſs of ſoul, does not offer to fly any farther, but ſits himſelf down. The hounds then ſurround him, and ruſhing on him all at once, are thus, with their united ſtrength, able to tear in pieces, almoſt in an inſtant, the ſtrongeſt of all wild beaſts. It is ſaid, that he has ſeldom time to give more than two or three ſlight ſtrokes with his paws (each of which ſtrokes is inſtant death) to an equal number of his aſſailants. M. de Buffon aſſerts alſo, that the lion may be hunted on horſeback, but that the horſes as well as the dogs

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Felis. must be trained to it. Dr Sparman, however, assures us, that the colonists hunt the lion with common hunting horses.

It is said, that horses in battle, or in other dangerous enterprizes, suffer themselves more willingly to be caparisoned by their riders than at other times. This circumstance Dr Sparman likewise remarked in these animals on the above expeditions. "Our horses (says he), the very same as had several times, in the manner above mentioned, shown their disquietude when the lion happened to be in the vicinity of them, and which were not in the least trained to the chace, once exhibited a spirit in the pursuit of two large lions, equal to that which they had shown at other times in chasing the timid gazels; though, in fact, hunting horses seem to partake much more of their master's pleasure in the chace. I remember, in particular, at Agter Bruntjes Hoogte, I rode a horse, which, by a tremulous sound issuing from its chest, cocking up its ears, and prancing and capering, discovered, in an unequivocal manner, its ardour for the chace, whenever it came in sight of the larger kind of game. There have ever been instances of hunting horses, who, when the hunter has jumped off their backs in order to discharge his piece, but has missed his mark, have in their eagerness for the chace, not allowed him time sufficient to mount again, but followed the game alone for hours together, close at its very heels, in all its turnings and windings."

The chace of the lion on horseback is carried on at the Cape in the following manner, as described by Dr Sparman.

"It is only on the plains that the hunters venture to go out on horseback in this chace. If the lion keeps in some coppice or wood, on a rising ground, they endeavour to teize it with dogs till it comes out; they likewise prefer going together two or more in number, in order to be able to assist and rescue each other, in case the first shot should not take place. When the lion sees the hunters at a great distance, it is universally allowed that he takes to his heels as fast as ever he can, in order to get out of their sight; but if they chance to discover him at a small distance from them, he is then said to walk off in a surly manner, but without putting himself in the least hurry, as though he was above showing any fear, when he finds himself discovered or hunted. He is therefore reported likewise, when he finds himself pursued with vigour, to be soon provoked to resistance, or at least he disdains any longer to fly. Consequently he slackens his pace, and at length only slides slowly off, step by step, all the while eying his pursuers askaunt; and finally makes a full stop, and turning round upon them, and at the same time giving himself a shake, roars with a short and sharp tone, in order to show his indignation, being ready to seize on them, and tear them in pieces. This is now precisely the time for the hunters to be upon the spot, or else to get as soon as possible within a certain distance of him, yet so as at the same time to keep a proper distance from each other; and he that is neareſt, or is most advantageously posted, and has the best mark of that part of the lion's body which contains his heart and lungs, must be the first to jump off his horse, and, securing the bridle by putting it round his arm, discharge his piece; then in an instant recovering his seat, must ride obliquely athwart his companions; and, in fine, giving his horse the reins, must trust entirely to the speed and fear of this latter, to convey him out of the reach of the fury of the wild beast, in case he has only wounded him, or has absolutely missed him. In either of these cases, a fair opportunity presents itself for some of the other hunters to jump off their horses directly, as they may then take their aim and discharge their pieces with greater coolness and certainty. Should this shot likewise miss (which, however, seldom happens), the third sportsman rides after the lion, which at that instant is in pursuit of the first or the second, and, springing off his horse, fires his piece, as soon as he has got within a proper distance, and finds a sufficiently convenient part of the animal present itself, especially obliquely from behind. If now the lion turns upon him too, the other hunters turn again, in order to come to his rescue with the charge which they loaded with on horseback, while they were flying from the wild beast. No instance has ever been known of any misfortune happening to the hunters in chasing the lion on horseback. The African colonists, who are born in, or have had the courage to remove into the more remote parts of Africa, which are exposed to the ravages of wild beasts, are mostly good marksmen, and are far from wanting courage. The lion that has the boldness to seize on their cattle, which are the most valuable part of their property, sometimes at their very doors, is as odious to them as he is dangerous and noxious. They consequently seek out these animals, and hunt them with the greatest ardour and glee, with a view to exterminate them." Felis.

II. The *Tigris*, or TIGER. The size of this animal, according to some authors, is larger, and, according to others, somewhat less, than the lion. M. de la Landemagon assures us, that he has seen a tiger in the East Indies 15 feet long, including undoubtedly the length of the tail, which, supposing it to be four feet, makes the body of the tiger about 11 feet in length. The skeleton preserved in the cabinet of the French king, indicates that the animal was about seven feet long from the point of the muzzle to the origin of the tail; but then it must be considered, that he was caught young, and lived all his days in confinement. The head of the tiger is large and roundish; and the ears are short, and at a great distance from each other. The form of the body has a great resemblance to that of the panther. The skin is of a darkish yellow colour, striped with long black streaks; the hair is short, excepting on the sides of the head, where it is about four inches long. The point of the tail is black, and the rest of it is interspersed with black rings. His legs and claws resemble those of the lion, only the legs are much shorter in proportion to the size of the animal. Tiger.

The tiger is more ferocious, cruel, and savage than the lion. Although gorged with carnage, his thirst for blood is not appeased; he seizes and tears in pieces a new prey with equal fury and rapacity, the very moment after devouring a former one; he lays waste the country he inhabits; he neither dreads the aspect nor the weapons of men; puts to death whole troops of domestic animals; and attacks young elephants, rhinoceroses, and sometimes even braves the lion himself.

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Felis. The tiger seems to have no other instinct, but a constant thirst after blood, a blind fury which knows no bounds or distinction, and which often stimulates him to devour his own young, and to tear the mother in pieces for endeavouring to defend them. He lies in wait on the banks of rivers, &c. where the heat of the climate obliges other animals to repair for drink. Here he seizes his prey, or rather multiplies his massacres; for he no sooner kills one animal, than he flies with equal fury upon the next, with no other view but to plunge in his head into their bodies and drink their blood. However, when he kills a large animal, as a horse or a buffalo, he sometimes does not tear out the entrails on the spot; but, to prevent any interruption, he drags them off to the wood, which he performs with incredible swiftness. This is a sufficient specimen of the strength of this rapacious animal.

Neither force, restraint, or violence, can tame the tiger. He is equally irritated with good as with bad treatment: he tears the hand which nourishes him with equal fury, as that which administers blows: he roars and is enraged at the sight of every living creature. Almost every natural historian agrees in this horrible character.

There is a sort of cruelty in their devastations, unknown to the generous lion; as well as a poltroonry in their sudden retreat on any disappointment. "I was informed (says Mr Pennant) by very good authority, that in the beginning of this century, some gentlemen and ladies, being on a party of pleasure, under a shade of trees, on the banks of a river in Bengal, observed a tiger preparing for its fatal spring; one of the ladies, with amazing presence of mind, laid hold of an umbrella, and furled it full in the animal's face, which instantly retired, and gave the company opportunity of removing from so terrible a neighbour. Another party had not the same good fortune: a tiger darted among them while they were at dinner, seized on one gentleman, and carried him off, and he never was more heard of." The tiger attacks all sorts of animals, even the lion; and it has been known that both have perished in their combats. There is in some parts of India a popular notion, that the rhinoceros and the tiger are in friendship, because they are often found near each other. But according to Mr Pennant, the fact is, that the rhinoceros, like the hog, loves to wallow in the mire; and on that account frequents the banks of rivers: the tiger, to quench its raging thirst, is met with in places contiguous to them.

Pliny has been frequently taken to task by the moderns, for calling the tiger *animal tremendæ velocitatis*: they allow it great agility in its bounds, but deny it swiftness in pursuit. Two travellers of authority, however, both eye-witnesses, confirm what Pliny says: the one indeed only mentions in general its vast fleetness; the other saw a trial between one and a swift horse, whose rider escaped merely by getting in time amidst a circle of armed men. The chase of this animal was a favourite diversion with the great Cam-hi, the Chinese monarch, in whose company our countryman Mr Bell *, that faithful traveller, and the Pere Gerbilion, saw these proofs of the tiger's speed.

* *Travels*, vol. ii. p. 91.

The tiger, according to Mr Pennant, is peculiar to Asia; and is found as far north as China and Chinese Tartary, and about lake Aral and the Altaic mountains. It inhabits mount Ararat and Hyrcania, of old famous for its wild beasts; but the greatest numbers, the largest, and the most cruel, are met with in India and its islands. In Sumatra the natives are so infatuated that they seldom kill them, having a notion that they are animated by the souls of their ancestors. Felis.

The tiger has always been a more rare animal than the lion; and yet brings forth an equal number of young, namely, four or five at a litter. The female is furious at all times; but, when her young are attempted to be taken from her, her rage is redoubled: she braves every danger; she pursues the ravishers, who are obliged, when hard pressed, to drop one of the young in order to retard her motion; she stops, takes it up, and carries it into some secret part of the forest; but she instantly returns and pursues the hunters into their villages or boats.

The tiger moves the skin of his face, grinds his teeth, and roars, like the lion; but the sound of his voice is different.

III. The *Pardus*, or PANTHER.—It is about the size of a large dog, and has a great resemblance to a domestic cat. The tongue is rough, and remarkably red; the teeth are strong and sharp; the skin is exceedingly beautiful, being of a yellow colour, variegated with roundish black spots, and the hair is short. It has a cruel and ferocious aspect; his motions are brisk and lively; his cry resembles the growl of an enraged dog, but is more strong and rough. Panther.

The panther inhabits Africa, from Barbary to the remotest parts of Guinea. This species is next in size to the tiger; next to it in cruelty, and in its general enmity to the animal creation: it is to Africa what the former is to Asia, with this alleviation, that it prefers the flesh of brutes to that of mankind; but when pressed with hunger, attacks every living creature without distinction. Its manner of taking its prey is the same with that of the tiger, always by surprise, either lurking in thickets or creeping on its belly till it comes within reach: it will also climb up trees in pursuit of monkies and lesser animals; so that nothing is secure from its attacks. He is not so perfectly ungovernable as the tiger: but, notwithstanding all attempts to render him obedient and tractable, he may rather be said to be subdued than tamed; for he never entirely loses his natural ferocity. Accordingly, when kept with a view to the hunting of bucks, goats, or other animals, great care is necessary in training him, and still greater in conducting him. When leading out to the field, they put him in a cage and carry him on a cart. When the game is sprung, they open the door of the cage; he instantly springs towards the animal, often seizes him in a few bounds, throws him to the ground, and strangles him. But, if he happens to miss his aim, he becomes mad with rage, and sometimes falls upon his master, who, in order to prevent accidents of this kind, generally carries along with him pieces of flesh, or perhaps a lamb or a kid, which he throws to him in order to appease his fury.

The ancients were well acquainted with these animals. These, and the leopards, were the *Varie* and *Pardi* of the old writers: one should think that the Romans would have exhausted the deserts of Africa by the numbers they drew from thence for their public shows. Scaurus exhibited at one time 150 panthers;

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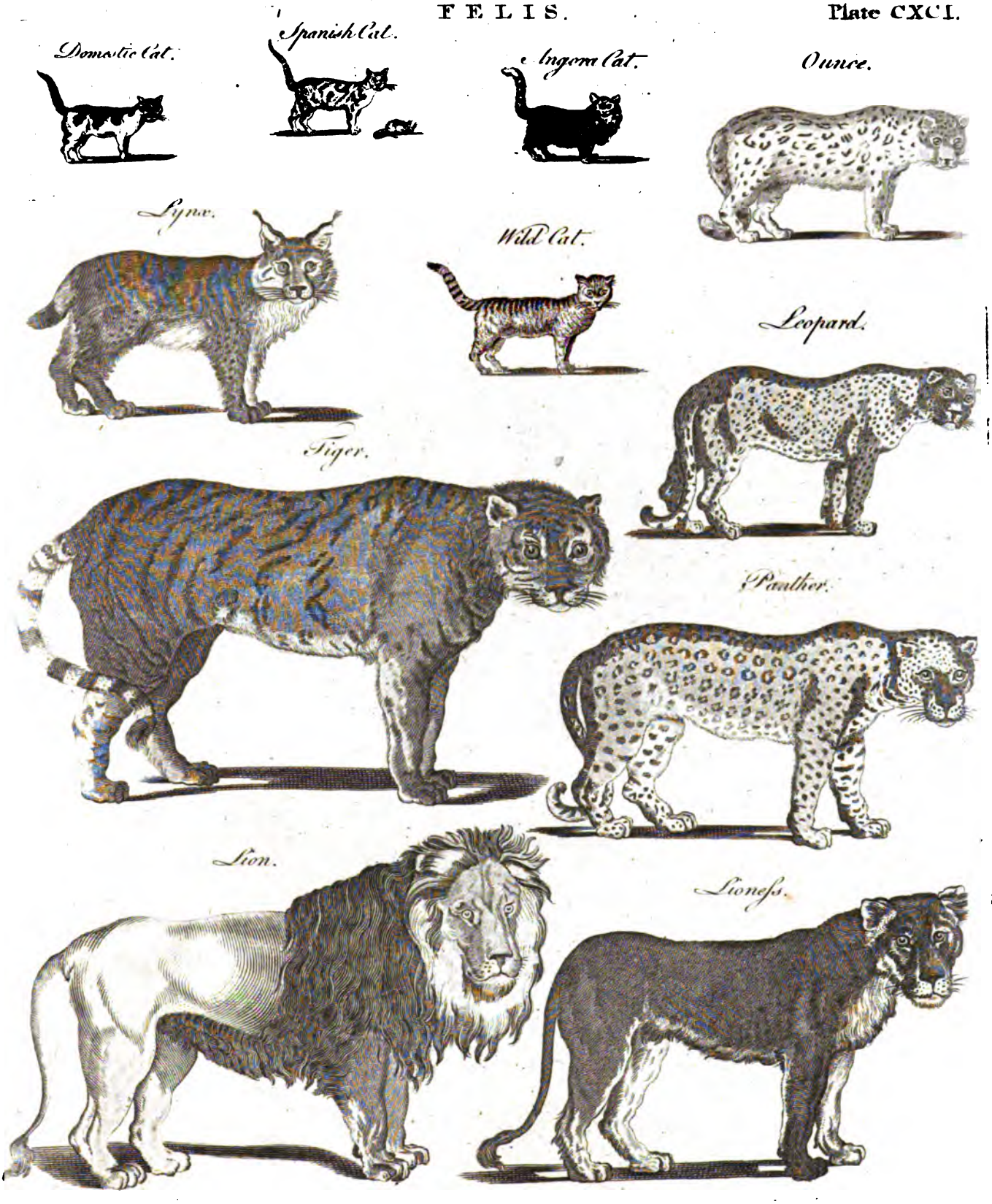
FELIS. Plate CXCI.



A. Bell Prin. Wal. Sculptor fecit.

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Felis. Pompey the Great, 410; Auguſtus, 420, Probably they thinned the coaſts of Mauritania of theſe animals, but they ſtill ſwarm in the ſouthern parts of Guinea.—Oppian deſcribes two ſpecies of panthers, a large ſpecies and a ſmall one; the firſt of which has a ſhorter tail than the leſſer, and may poſſibly be this kind.—An animal of this ſpecies is found in Buckharia, called there *Babr:* it is ſeven feet long, very deſtructive to horſes, and even camels; the ſkin is fine, and valued in Ruſſia at 1 l. Sterling.—In China there is a moſt remarkable kind, called there *Loucbu*, whoſe ſkins ſell at 6 l. Sterling a-piece. It muſt here alſo be obſerved, that there are in the furriers ſhops in London, ſkins in moſt reſpects reſembling thoſe of the panther; which, they aſſure us, come from the Spaniſh ſettlements in the Weſt Indies: Theſe ſkins equal thoſe of the old continent in beauty and ſize.

Though M. Buffon denies the panther to be an inhabitant of America, yet Mr Pennant is of opinion that the ſame, or a variety at leaſt, inhabits that country. 1. The figure of the ſpecies deſcribed by *Faber*, (*Hiſt. An. Nov. Hiſp.* p. 498.) under the name of *Tigris Mexicana*, agrees exactly with that of the panther, as does alſo the deſcription in general. 2. Every other animal of this genus, which has yet been diſcovered in America, is far inferior in ſize and ſtrength to this; whoſe common height, Faber ſays, is four or five feet, and whoſe prey is wild cattle, horſes, &c. *M. Condamine*, and *Le Pere Cajetan Cattaneo*, ſpeak of the tigers (*i. e.* the panthers) of America, as equal and even ſuperior in ſize to thoſe of Africa, and the colour as bright as gold; and Ulloa deſcribes them as big as little horſes. 3. Notwithſtanding the venders of furs are not entirely to be relied on as to the countries their goods come from, yet the general opinion of the whole trade, that theſe ſkins were the product of Spaniſh America, is a further proof of their being common to both continents.

Once. IV. The *Uncia*, or Once, is leſs than the panther; the tail is longer; the hair is likewiſe longer, and of a whitiſh grey colour. The once is eaſily tamed; and is employed in hunting in ſeveral parts of Aſia, where dogs are very ſcarce. He has not the delicate ſcent of a dog; does not trace other animals by the ſmell; neither can he run them down in a fair chace; but lies in wait for their approach, and then darts upon them unawares. He leaps ſo nimbly, that he eaſily clears a ditch or a wall ſeveral feet high; beſides, he often climbs trees, waits till ſome animal paſſes, and inſtantly leaps upon them. This method of catching their prey, is practiſed by the panther and leopard, as well as by the once.—The once inhabits Barbary, Perſia, Hyrcania, and China; from which laſt place the ſkins are brought into Ruſſia, and ſold for 20s. a-piece. It is an animal of a more gentle and mild nature than moſt of the preceding. It is, like the next ſpecies, uſed for the chace of antelopes, and even hares; but, inſtead of being conveyed in a waggon, is carried on the crupper on horſeback. It is under as much command as a ſetting-dog; returns at the leaſt call, and jumps up behind its maſter. This animal is ſuppoſed to be the leſſer panther of Oppian, and the panthera of Pliny.

Leopard. V. The *Leopardus* or Leopard, differs from the panther and the once, in the beauty of his colour, which is a lively yellow, with ſmaller ſpots than thoſe of the two latter, and diſpoſed in groups. He is larger than the once, and leſs than the panther. He inhabits Senegal and Guinea; and ſpares neither man nor beaſt. When beaſts of chace fail, the leopards deſcend from the internal parts of Africa in crowds, and make great havock among the numerous herds that cover the rich meadows of the lower Guinea. It tears its prey to pieces with both claws and teeth; but is always thin, though perpetually devouring. The panther is its enemy, and deſtroys numbers of them. The negreſſes make collars of their teeth, and attribute to them certain virtues. The negroes take theſe animals in pit-falls, covered at the top with ſlight hurdles, on which is placed ſome fleſh as a bait. They make a banquet of their fleſh, which is ſaid to be as white as veal, and very well taſted. Leopards ſkins are often brought to Europe, and reckoned very valuable. In Aſia theſe animals are found in the mountains of Caucaſus, from Perſia to India; and alſo in China, where they are called *Poupi*. By the Bucharian traders, who often bring their ſkins to Ruſſia, they are ſtyled *Bars*. The leopard inhabits alſo Arabia, where it is called *Nemr*. We are informed by Mr Forſkal, that in that country, as well as in Egypt, it will do no harm to man unleſs provoked; but will enter houſes by night, and deſtroy the cats.

Jaguar. VI. The *Onca*, or American Tiger, (the Jaguar of Buffon), is of a bright tawny colour; the top of the back marked with long ſtripes of black; the ſides with rows of irregular oblong ſpots; open in the middle, which is of the ground-colour of the hair: the thighs and legs are marked with full ſpots of black, the breaſt and belly whitiſh: the tail not ſo long as the body. This ſpecies, which grows to the ſize of a wolf, and even larger, inhabits the hotteſt parts of South America, from the iſthmus of Darien to Buenos Ayres. It is fierce, and deſtructive to man and beaſt. Like the tiger, it plunges its head into the body of its prey, and ſucks out the blood before it devours it. It makes a great noiſe in the night, like the howling of a hungry dog; and is a very cowardly animal. It is eaſily put to flight, either by the ſhepherds dogs, or by a lighted torch, being very fearful of fire. It lies in ambuſh near the ſides of rivers; and there is ſometimes ſeen a ſingular combat between this animal and the crocodile. When the jaguar comes to drink, the crocodile, ready to ſurpriſe any animal that approaches, raiſes its head out of the water; upon which the former inſtantly ſtrikes its claws into the eyes of this dreadful reptile, the only penetrable part, who immediately dives under the water, pulling his enemy along with it, where they commonly both periſh.

Ocelot. VII. The *Pardalis*, Mexican panther, or the Ocelot of Buffon, has its head, back, upper part of the rump, and tail, of a bright tawny; a black ſtripe extending along the top of the back, from head to tail; and from the noſtrils to the corners of the eyes, there alſo runs a ſtripe of black; the ſides are whitiſh, marked lengthways with long ſtripes of black, hollow and tawny in the middle, in which are ſprinkled ſome ſmall black ſpots; the legs are whitiſh, varied with ſmall black ſpots; and the tail is alſo varied with ſmall ſpots near its baſe, and larger near the end, which is black. It is above four times the ſize of a large cat, and ſtrongly

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Felis. strongly made. It inhabits Mexico, the neighbourhood of Carthagena, and Brasil. It lives in the mountains; and is very voracious, but fearful of mankind; preying on young calves, and different sorts of game. It lurks amidst the leaves of trees; and sometimes will extend itself along the boughs as if dead, till the monkies, tempted by their natural curiosity, approaching to examine it, become its prey.

Hunting Leopard. VIII. The *Jubata*, or HUNTING LEOPARD, (*Guepard* Buff.) is of the size of a large grehound, of a long make, with a narrow cheft and long legs. The colour of the body is a light tawny brown marked with numbers of small round black spots; the neck is shaggy, and the tail is longer than the body. It inhabits India; where it is tamed, and trained for the chace of antelopes. For this purpose it is carried in a small kind of waggon, chained and hoodwinked, till it approaches the herd: when first unchained, it does not immediately make its attempt, but winds along the ground, stopping and concealing itself till it gets a proper advantage, and then darts on the animals with surprising swiftness. It overtakes them by the rapidity of its bounds: but if it does not succeed in its first efforts, consisting of five or six amazing leaps, it misses its prey: losing its breath, and finding itself unequal in speed, it stands still, gives up the point for that time, and readily returns to its master. This species is called in India, *Chittah*. It is used for the taking of jackals, as well as other animals.

Black Tiger. IX. The *Discolor*, or BLACK TIGER, (*Couguar Noir*, Buff.), is covered with short very glossy hairs of a dusky colour; the throat, belly, and inside of the legs, white. It grows to the size of a heifer of a year old, and has vast strength in its limbs. It inhabits Brasil and Guiana; and is a cruel and fierce beast, but happily is a scarce species.

Puma. X. The *Concolor*, or PUMA (*Couguar*, Buff.) has a very small head, ears a little pointed, and eyes large. The back, neck, rump, sides, are of pale brownish red, mixed with dusky hairs; the breast, belly, and inside of the legs, cinereous. The tail is dusky and ferruginous, the tip black; and the teeth are of a vast size. It is long bodied, and high on its legs; the length from nose to tail five feet three inches, of the tail two feet eight. This animal inhabits the continent of America, from Canada to Brasil: in South America is called *Puma*, and by Europeans mistaken for the lion. It is the scourge of the colonies of the hotter parts of America, being fierce and ravenous to the highest degree. It swims over the broad rivers; attacks the cattle in the very inclosures; and when pressed with hunger, spares not even mankind. In North America their fury seems to be subdued by the rigor of the climate; and the smallest cur, in company with its master, makes them seek for security, by running up trees: but then they are equally destructive to domestic animals, and are the greatest nuisance the planter has: when they lay in wait for the moose, or other deer, they lie close on the branch of some tree till the animal passes beneath, when they drop upon and soon destroy them. They also make wolves their prey: In the Museum of the Royal Society, there is the skin of one which was killed just as it had pulled down a wolf. When it has satisfied itself with eating, it carefully conceals the rest of the carcase, covering it with leaves: if any other touches the relics, it never comes near them again. It sometimes purs like a cat, and at other times makes a great howling. The fur is soft, and of some value among the Indians, who cover themselves with it during winter; and who also eat the flesh, which is said to be as good and as white as veal. Felis.

XI. The *Tigrina*, or MARGAY of Buffon, is about the size of a common cat. The upper part of the head, the neck, back, sides, shoulders, and thighs, are of a bright tawny-colour: the face is striped downwards with black: the shoulders and body are marked with stripes and oblong large black spots; the legs with small spots: the thighs are whitish, spotted with black: The tail is very long, marked with black, tawny and grey. It inhabits South America, where it lives on the feathered game and on poultry. It is untameable. It makes a noise like the common cat; lives much in trees; is very active, and goes by bounds or leaps. It brings forth in all seasons of the year, in hollow trees, and has two at a time. Margay.

XII. The *Capensis*, Cape Tiger, or TIGER-CAT of the Cape, is the *Nsuffi* of Labat, who was the first who noticed this species, which he describes as "of the size of a dog, with a coat as much striped and varied as that of a tiger. Its appearance bespeaks cruelty, and its eyes fierceness; but it is cowardly, and gets its prey only by cunning and insidious arts." All these characters are perfectly applicable to the Cape cat; and it seems the animal is found in all parts of Africa, from Congo to the Cape of Good Hope, in an extent of country of about eleven degrees of latitude. Kolben also speaks of a tiger bush-cat, which he describes as the largest of all the wild cats of the Cape countries, and as spotted something like a tiger. A skin of this animal was seen by Mr Pennant in a furrier's shop in London, who thought it came from the Cape of Good Hope; from this skin Mr Pennant gave the first description which could be of any utility to a natural historian. All the other authors mention this animal in a vague manner. When Dr Forster touched the second time at the Cape of Good Hope in the year 1775, an animal of this species was offered him to purchase; but he refused buying it because it had a broken leg, which made him apprehensive of losing it by death during the passage from the Cape to London. It was very gentle and tame. It was brought in a basket to his apartment, where he kept it above 24 hours; which gave him the opportunity of describing it more accurately than had hitherto been done, and of observing its manners and economy. These he found to be perfectly analogous to those of our domestic cats. It ate fresh raw meat, and was very much attached to its feeders and benefactors: tho' it had broke the fore leg by accident, it nevertheless was very easy. After it had been several times fed by our author, it soon followed him like a tame favourite cat. It liked to be stroked and caressed; it rubbed its head and back always against the person's cloaths who fed it, and desired to be made much of. It purred as our domestic cats do when they are pleased. It had been taken when quite young in the woods, and was not above eight or nine months old; but had already very nearly, if not quite, attained its full growth. The Doctor was told, that the tiger-cats live in mountainous and woody tracts; and that Tiger-cat.

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Felis. in their wild ſtate they are very great deſtroyers of hares, rabbits, yerbuas, young antelopes, lambkins, and of all the feathered tribe. A very particular technical deſcription of this ſpecies is given in the Phil. Tranſ. vol. 71. p. 4. with a figure, which the reader will ſee copied among other ſpecies in our plates.

Cat. XIII. The *Catus*, or CAT.

1. The *ferus*, or wild cat, is three or four times as large as the houſe cat; the head larger, and the face flatter. The teeth and claws are tremendous: its muſcles very ſtrong, as being formed for rapine: the tail is of a moderate length, but very thick, marked with alternate bars of black and white, the end always black: the hips and hind part of the lower joints of the leg are black: the fur is very ſoft and fine. The general colour of theſe animals is of a yellowiſh white, mixed with a deep grey: theſe colours, though they appear at firſt ſight confuſedly blended together, yet on a cloſe inſpection will be found to be diſpoſed like the ſtreaks on the ſkin of the tiger, pointing from the back downwards, riſing from a black liſt that runs from the head along the middle of the back to the tail.

This animal, with us, may be called the *Britiſh tiger*. It is the fierceſt and moſt deſtructive beaſt we have; making dreadful havock among our poultry, lambs, and kids. It inhabits the moſt mountainous and woody parts of theſe iſlands, living moſtly in trees, and feeding only by night. It multiplies as faſt as our common cats; and often the females of the latter will quit their domeſtic mates, and return home pregnant by the former.

They are taken either in traps or by ſhooting: in the latter caſe, it is very dangerous only to wound them; for they will attack the perſon who injured them, and have ſtrength enough to be no deſpicable enemy. Wild cats were formerly reckoned among the beaſts of chace; as appears by the charter of Richard II. to the abbot of Peterborough, giving him leave to hunt the hare, fox, and wild cat. The uſe of the fur was in lining of robes: but it was eſteemed not of the moſt luxurious kind; for it was ordained, "that no abbeſs or nun ſhould uſe more coſtly apparel than ſuch as is made of lambs or cats ſkins." In much earlier times it was alſo the object of the ſportſman's diverſion.

This animal is the ſtock or origin of the domeſtic cat in all its varieties.—It inhabits the woods of moſt parts of Europe, but none are found in the vaſt woods of Ruſſia or Siberia. It dwells with the common lynx in all the wooded parts of the mountains of Caucaſus and their neighbourhood; and is moſt deſtructive to lambs, kids, fawns, and to all ſorts of feathered game.

2. The *domeſticus*, or tame cat, is ſo well known, that it requires no deſcription. It is an uſeful, but deceitful domeſtic. Although when young they are playful and gay, they poſſeſs at the ſame time an innate malice and perverſe diſpoſition, which increaſes as they grow up, and which education learns them to conceal, but never to ſubdue. Conſtantly bent upon theft and rapine, though in a domeſtic ſtate, they are full of cunning and diſſimulation; they conceal all their deſigns; ſeize every opportunity of doing miſchief, and then fly from puniſhment. They eaſily take on the habits of ſociety, but never its manners; for they have only the appearance of friendſhip and attachment. This diſingenuity of character is betrayed by the obliquity of their movements and the ambiguity of their looks. In a word, the cat is totally deſtitute of friendſhip; he thinks and acts for himſelf alone. He loves eaſe, ſearches for the ſofteſt and warmeſt places to repoſe himſelf. The cat is likewiſe extremely amorous; and, which is very ſingular, the female is more ardent than the male: ſhe not only invites, but ſearches after and calls upon him to ſatisfy the fury of her deſires; and, if the male diſdains or flies from her, ſhe purſues, bites, and in a manner compels him. This heat of paſſion in the females laſts but nine or ten days, and happens twice in the year, namely, in the ſpring and autumn; however, in ſome it happens thrice or four times in the year. The female goes with young 55 or 58 days, and generally produces four or five at a litter. As the male has an inclination to deſtroy the young, the female takes care to conceal them from him; and, when ſhe is apprehenſive of a diſcovery, ſhe takes them up in her mouth one by one, and hides them in holes or inacceſſible places. When ſhe has nurſed a few weeks, ſhe brings them mice, ſmall birds, &c. in order to learn them to eat fleſh. But it is worth notice, that theſe careful and tender mothers ſometimes become unnaturally cruel, and devour their own offspring.

The cat is incapable of reſtraint, and conſequently of being educated to any extent. However, we are told, that the Greeks in the iſland of Cyprus trained this animal to catch and devour ſerpents, with which that iſland was greatly infeſted. This, however, was not the effect of obedience, but of a general taſte for ſlaughter; for he delights in watching, attacking, and deſtroying all kinds of weak animals indifferently. He has no delicacy of ſcent, like the dog; he hunts only by the eye: neither does he properly purſue; he only lies in wait, and attacks animals by ſurpriſe; and after he has caught them, he ſports with and torments them a long time, and at laſt kills them (when his belly is full), purely to gratify his ſanguinary appetite.

The eye of the cat differs greatly from that of moſt other animals. The pupil is capable of a great degree of contraction and dilatation. It is narrow and contracted like a line during the day, round and wide in the dark. It is from this conformation of the eye that the cat ſees beſt in the night, which gives him a great advantage in diſcovering and ſeizing his prey.

Although cats live in our houſes, they can hardly be called *domeſtic* animals; they may rather be ſaid to enjoy full liberty; for they never act but according to their own inclination. Beſides, the greateſt part of them are half wild: they do not know their maſters; and frequent only the barns, out-houſes, &c. unleſs when preſſed with hunger.

Cats have a natural antipathy at water and cold. They likewiſe hate bad ſmells; but they have an affection for certain aromatic ſmells, and are tranſported with the root of the valerian.

Cats take about 18 months before they come to their full growth; but they are capable of propagation in 12 months, and retain this faculty all their life, which generally extends to nine or ten years. They eat ſlowly, and are peculiarly fond of fiſh. They drink frequently; their ſleep is light; and they often aſſume the appearance of ſleeping, when in reality they are meditating miſchief. They walk ſoftly, and without making any

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Felis. noiſe. As their hair is always dry, it eaſily gives out an electrical fire, which becomes viſible when rubbed acroſs in the dark. Their eyes likewiſe ſparkle in the dark like diamonds.—The cat, when pleaſed, purrs, and moves its tail: when angry, it ſpits, hiſſes, and ſtrikes with its foot. It waſhes its face with its fore-foot (Linnæus ſays, at the approach of a ſtorm): it always lights on its feet: it is even proverbially tenacious of life.

Our anceſtors ſeem to have had a high ſenſe of the utility of this animal. That excellent prince *Hoel dda*, or Howel the Good, did not think it beneath him (among his laws relating to the prices, &c. of animals*), to include that of the cat; and to deſcribe the qualities it ought to have. The price of a kitten before it could ſee was to be a penny; till it caught a mouſe, two-pence; when it commenced mouſer, four pence. It was required beſides, that it ſhould be perfect in its ſenſes of hearing and ſeeing, be a good mouſer, have the claws whole, and be a good nurſe: but if it failed in any of theſe qualities, the ſeller was to forfeit to the buyer the third part of its value. If any one ſtole or killed the cat that guarded the prince's granary, he was to forfeit a milch-ewe, its fleece and lamb; or as much wheat as, when poured on a cat ſuſpended by its tail (the head touching the floor), would form a heap high enough to cover the tip of the former. This laſt quotation is not only curious, as being an evidence of the ſimplicity of ancient manners, but it almoſt proves to a demonſtration, that cats are not aborigines of theſe iſlands, or known to the earlieſt inhabitants. The large prices ſet on them (if we conſider the high value of ſpecie at that time †), and the great care taken of the improvement and breed of an animal that multiplies ſo faſt, are almoſt certain proofs of their being little known at that period.

* *Leges Wallicæ*, p. 247, 248.

† *Anno* 948.

b, The Angorenſis, or cat of Angora, with hair of a ſilvery whiteneſs and ſilky texture, and very long, eſpecially about the neck, where it forms a fine ruff. It is a large variety; found about Angora, the ſame country which produces the fine-haired goat. It degenerates after the firſt generation in our climate. A variety of this kind is found in China with pendent ears, of which the Chineſe are very fond, and ornament their necks with ſilver collars. They are cruel enemies to rats, and ſuppoſed to be the domeſtic animals which the Chineſe call *ſumxi*.

c, The Hiſpanicus, or tortoiſe-ſhell cat, has the hair varied with black, white, and orange.

d, The Cæruleus, or blue cat, a variety of a dun colour, or greyiſh black. It is much cultivated in Siberia on account of its fine fur; but was brought there, as well as the other domeſtic kinds, by the Ruſſians.

e, The Ruber, or wild red cat of Kolben, has a ſtreak of bright red running along the ridge of the back to the tail, and loſing itſelf in the grey and white on the ſides. The ſkins are ſaid to give eaſe in the gout, and are much valued on that account at the Cape.

Manul. XIV. The Manul, with the tail longer than that of the domeſtic cat, beſet thickly with hair, and of an equal thickneſs in all parts; encircled with ten black rings, the three next to the tip almoſt touching one another, the reſt more remote. It is about the ſize of a fox. The limbs are very robuſt; in which, and in colour, this animal greatly reſembles a lynx, afterwards deſcribed. It inhabits all the middle part of northern Aſia, from the Yaik, or Ural as it is now called, to the very Amur. It loves open, woodleſs, and rocky countries, and preys on the leſſer quadrupeds. Felis.

Lynx. XV. The Lynx is about 2½ feet long and 15 inches high. He has a great reſemblance to the common cat; but his ears are longer, and his tail is much ſhorter: his hair is ſtreaked with yellow, white, and black colours. The lynx inhabits the vaſt foreſts of the north of Europe, Aſia, and America. His eyes are brilliant, his aſpect is ſoft, and his air is gay and ſprightly. Like the cat, he covers his urine with earth; he howls ſomething like the wolf, and is heard at a conſiderable diſtance; he does not run like the dog or wolf, but walks and leaps like a cat; he purſues his prey even to the tops of trees; neither wild cats nor ſquirrels can eſcape him; he lies in wait for ſtags, goats, hairs, &c. and darts ſuddenly upon them; he ſeizes them by the throat and ſucks their blood, then opens the head and eats the brain; after this, he frequently leaves them, and goes in queſt of freſh prey. The colour of his ſkin changes according to the ſeaſon or the climate; the winter furs are more beautiful than thoſe of ſummer. Theſe furs are valuable for their ſoftneſs and warmth: numbers are annually imported from North America, and the north of Europe and Aſia; the farther north and eaſt they are taken, the whiter they are, and the more diſtinct the ſpots. Of theſe the moſt elegant kind is called *irbys*, whoſe ſkin ſells on the ſpot for one pound Sterling. The ancients * celebrated the great quickneſs of the lynx's ſight; and feigned that its urine was converted into a precious ſtone.

* *Plin.* viii. 8. xxviii 8.

Serval. XVI. The Serval, has the upper part of the body of a duſky colour, interſperſed with round black ſpots; the belly, and the orbits of the eye, are white. This animal, which is very fierce and untameable, inhabits the woods in the mountainous parts of India; where it lives in trees, and breeds in them. It ſcarcely ever deſcends on the ground; but leaps with great agility from tree to tree. It is called by the natives of Malabar the *maraputé*, by the Portugueſe the *ſerval*.

Chaus. XVII. The Chaus, or Caſpian Lynx, has a round head, a little more oblong than that of the common cat; ſhining reſtleſs eye, with a moſt brilliant golden pupil; ears erect, oval, and lined with white hairs, their outſide reddiſh, their ſummits tufted with black. The hairs are coarſer than thoſe of the cat or common lynx, but leſs ſo than thoſe of the wolf. They are ſhorteſt on the head, but on the top of the back are above two inches long. The colour of the head and body is a yellowiſh brown: the breaſt and belly of a bright brown nearly orange. The tail reaches only to the flexure of the leg; is thick and cylindric; of the ſame colour with the back, tipped with black, and thrice obſcurely annulated with black near the end. In general appearance it has the form of the domeſtic cat. Its length is 2½ feet from the noſe to the baſe of the tail: its tail little more than 11 inches: its height before is 19 inches; behind, 20. It is ſometimes found larger, there being inſtances of its reaching the length of 3 feet from the noſe to the tail. This animal, which has been but lately diſcovered, inhabits the reeds and woods in the marſhy parts that border on the weſtern ſides of the Caſpian Sea, particularly about the caſtle Kiſſar on the river

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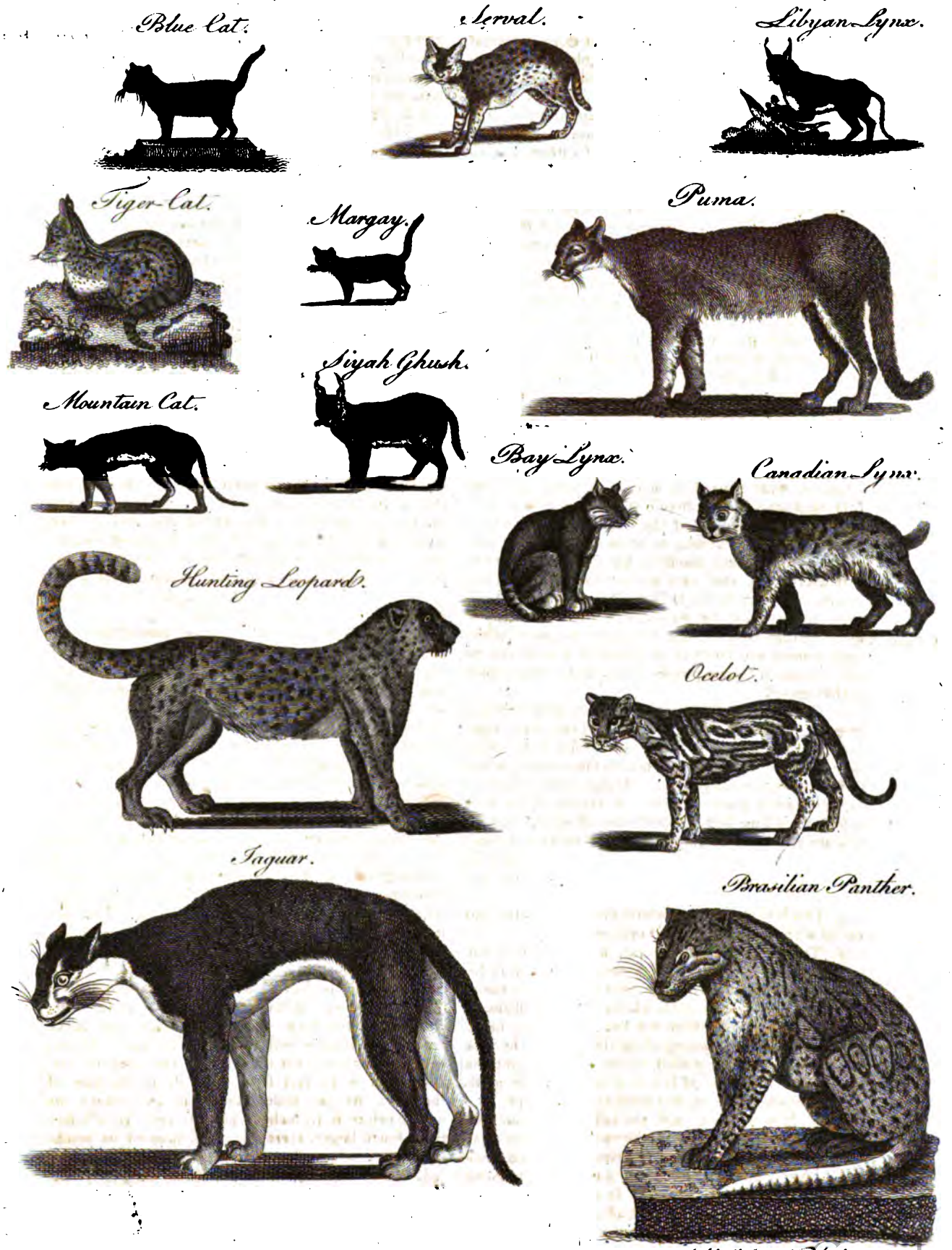
FELIS. Plate CXCII.



A. Bell Prin. Wal. Sculptor fecit.

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Felis. Terek, and in the Perſian provinces of Ghilan and Maſenderan, and frequent about the mouth of the Kur, the ancient Cyrus.—In manners, voice, and food, it agrees with the wild cat. It conceals itſelf in the day, and wanders over the flooded tracks in ſearch of prey; feeding on rats, mice, and birds, but ſeldom climbing trees. It is exceſſively fierce, and never frequents the haunts of mankind. It is ſo impatient of captivity, that one which was taken in a trap, and had a leg broken, refuſed for many days the food placed by it; but in its fury devoured the fractured limb, with pieces of the ſtake it was faſtened to, and broke all its teeth in the phrenſy of its rage.

Sivah Ghuſh. XVIII. The *Caracal*, Sivah Ghush, or Perſian Lynx, with a lengthened face and ſmall head; very long, ſlender ears, terminated with a long tuft of black hairs; eyes ſmall: the upper part of the body is of a very pale reddiſh brown; and the belly and breaſt are whitiſh: the limbs are ſtrong and pretty long; and the tail is about half the length of the body. Theſe animals inhabit Perſia, India, and Barbary; where they are often brought up tame, and uſed in the chace of leſſer quadrupeds, and the larger ſort of birds, ſuch as cranes, pelicans, peacocks, &c. which they ſurpriſe with great addreſs. When they ſeize their prey, they hold it faſt with their mouth, and lie for a time motionleſs on it. They are ſaid to attend the lion, and to feed on the remains of the prey which that animal leaves. They are fierce when provoked: Dr Charleton ſays, he ſaw one fall on a hound, which it killed and tore to pieces in a moment, notwithſtanding the dog defended itſelf to the utmoſt.—The Arabian writers call it *anak el ard;* and ſay, that it hunts like the panther, jumps up at cranes as they fly, and covers its ſteps when hunting.

Libyan Lynx. The Libyan Lynx is a variety, with ſhort black tufts to the ears, which are white within, and of a lively red without; the tail white at the tip, annulated with four black rings, with black marks behind the four legs. It is greatly inferior in ſize to the former; not larger than a common cat. It inhabits both Libya and Barbary.

Bay Lynx. XIX. The *Rufa*, or Bay Lynx, with a ſhort tail, yellow irides, and upright ſharp-pointed ears, tufted with long black hairs: the colour of the head, back, ſides, and exterior parts of the legs, bright bay, obſcurely marked with duſky ſpots: from beneath each eye certain long black ſtripes, of an incurvated form, mark the cheeks; which, with the upper and under lip, whole under ſide of the body, and inſides of the legs, are white: the upper part of the tail is barred with duſky ſtrokes; and next the end, one of a deep black; its tip and under ſide are white. This animal, which is about twice the bigneſs of a large cat, inhabits the inner parts of the province of New York.

Canadian Lynx. XX. The Canadian Lynx, with pale yellow eyes, and erect ears tufted with black long hair. The body is covered with ſoft and long fur, cinereous tinged with tawny, and marked with duſky ſpots, more or leſs viſible in different ſubjects, dependent on the age or ſeaſon in which the animal is killed: the legs are ſtrong and thick; the claws large. It is about three times the ſize of a common cat: the tail is only four inches long, tipt with black. This ſpecies inhabits the vaſt foreſts of North America. It is called in Canada *le chat-cervier*, or *le loup-cervier*, on account of its being ſo deſtructive to deer; which it drops on from the trees, like the *puma*, and, fixing on the jugular vein, never quits its hold till the exhauſted animal falls through loſs of blood. The Engliſh call it a *wild cat*. It is very deſtructive to their young pigs, poultry, and all kind of game. The ſkins are in high eſteem for the ſoftneſs and warmneſs of the fur; and great numbers are annually imported into Europe. Felis ‖ Felo.

Cat-a-mountain. XXI. The *Mountain Lynx*, or Cat-a-mountain, upright pointed ears, marked with two brown bars; with the head and upper part of the body of a reddiſh brown, with long narrow ſtripes of black; the ſides and legs with ſmall round ſpots: the chin and throat are of a clear white; the belly of a dull white. The length of the animal, from noſe to tail, is two feet and a half; of the tail, eight inches. It inhabits North America; and is ſaid to be a gentle animal, and to grow very fat.

FELL (Dr John), a very learned Engliſh divine and biſhop, entered a ſtudent at Chriſt-church, Oxford, 1636. In 1648, he was ejected by the parliamentary viſitors, being then in holy orders: and from that time to the reſtoration lived at Oxford a retired and ſtudious life. He was inſtalled canon of Chriſt-church, July 1660; and the year following, dean of that church; in which places he did great ſervices to the college, and reformed ſeveral abuſes. He was conſecrated biſhop of Oxford in 1675; and had leave to hold his deanry in *commendam*, that he might continue his ſervices to the college and univerſity. He publiſhed ſeveral works, and died in 1686.

FELLING *of* Timber.—Many circumſtances are well known and conſtantly obſerved in the felling of timber for building, which, though to a haſty obſerver they might appear trifling, yet prove, on experience, to be of the utmoſt conſequence. One thing obſerved by M. de Buffon, which very greatly increaſes the ſolidity and ſtrength of timber, is, that the trees intended to be felled for ſervice ſhould firſt be ſtripped of their bark, and ſuffered to ſtand and die upon the ſpot before the cutting. The ſappy part or blea of the oak, becomes by this means as hard and firm as the heart; and the real ſtrength and denſity of the wood has been proved, by many experiments, to be greatly increaſed by it: nor is this a practice of any detriment to the proprietor, ſince the remaining ſtumps of theſe trees ſend up their young ſhoots as vigorouſly as if they had been cut down in their natural condition.

When any tree is to be cut down for timber, the firſt thing to be taken care of is a ſkilful diſbranching of ſuch limbs as may endanger in its fall: many trees are utterly ſpoiled for want of a previous care of this kind. In arms of timber that are very great, it is always neceſſary to chope or ſink in them cloſe to the bole, and then meeting it with down-right ſtrokes, it will be ſevered from the tree without ſplitting. In felling the tree, take care always to cut it as cloſe to the ground as poſſible, unleſs it is intended to be grubbed up: and the doing that is of advantage both to the timber and to the wood; for timber is never ſo much valued, if it be known to grow out of old ſtocks.

FELLOWSHIP, Company, or *Diſtributive-Proportion*, in arithmetic. See Arithmetic, n° 15

FELO DE SE, in law, a perſon that lays deliberate-

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Felon, Felony.

ly violent hands on himself, and is the occasion of his untimely death, whether by hanging, drowning, stabbing, shooting, or any other way.

FELON, in law, a person guilty of felony. See FELONY.

Blackst. Comment.

FELONY, in the general acceptation of the law, comprises every species of crime, which occasions at common law the forfeiture of lands or goods. This most frequently happens in those crimes for which a capital punishment either is or was to be inflicted: for those felonies that are called *clergyable*, or to which the benefit of clergy extends, were anciently punished with death in all lay, or unlearned, offenders; though now, by the statute-law, that punishment is for the first offence universally remitted. Treason itself, says Sir Edward Coke, was anciently comprised under the name of *felony:* and in confirmation of this we may observe, that the statute of treasons, 25 Edw. III. *c.* 2. speaking of some dubious crimes, directs a reference to parliament; that it may be there adjudged, "whether they be treason or *other* felony." All treasons, therefore, strictly speaking, are felonies; though all felonies are not treason. And to this also we may add, that all offences, now capital, are in some degree or other felony: but this is likewise the case with some other offences, which are not punished with death; as suicide, where the party is already dead; homicide by chance-medley, or in self-defence; and petit-larceny, or pilfering; all which are (strictly speaking), felonies, as they subject the committers of them to forfeitures. So that, upon the whole, the only adequate definition of felony seems to be that which is before laid down; viz. an offence which occasions a total forfeiture of either lands or goods, or both, at the common law; and to which capital or other punishment may be superadded, according to the degree of guilt.

To explain this matter a little farther: The word *felony*, or *felonia*, is of undoubted feodal original, being frequently to be met with in the books of feuds, &c. but the derivation of it has much puzzled the juridical lexicographers, Prateus, Calvinus, and the rest: some deriving it from the Greek, φηλος, "an impostor or deceiver;" others from the Latin, *fallo fefelli*, to countenance which they would have it called *fellonia*. Sir Edward Coke, as his manner is, has given us a still stranger etymology; that it is *crimen animo felleo perpetratum*, "with a bitter or gallish inclination." But all of them agree in the description, that it is such a crime as works a forfeiture of all the offender's lands or goods. And this gives great probability to Sir Henry Spelman's Teutonic or German derivation of it: in which language indeed, as the word is clearly of feodal original, we ought rather to look for its signification, than among the Greeks and Romans. *Fe-lon* then, according to him, is derived from two northern words: FEF, which signifies (we well know) the fief, feud, or beneficiary estate; and LON, which signifies price or value. Felony is therefore the same as *pretium feudi*, the consideration for which a man gives up his fief; as we say in common speech, such an act is as much as your life, or estate is worth. In this sense it will clearly signify the feodal forfeiture, or act by which an estate is forfeited, or escheats, to the lord.

To confirm this, we may observe, that it is in this sense, of forfeiture to the lord, that the feodal writers constantly use it. For all those acts, whether of a criminal nature or not, which at this day are generally forfeitures of copyhold estates, are styled *felonia* in the feodal law: "*scilicet, per quas feudum amittitur.*" As "*si domino deservire noluerit;—si per annum et diem cessaverit in petenda investitura;—si dominum ejuravit, i. e. negavit se a domino feudum habere;—si a domino in jus eum vocante, ter citatus non comparuerit;*"—all these, with many others, are still causes of forfeiture in our copyhold estates, and were denominated *felonies* by the feodal constitutions. So likewise injuries of a more substantial or criminal nature were denominated *felonies*, that is, forfeitures: as assaulting or beating the lord; vitiating his wife or daughter, "*si dominum cucurbitaverit, i. e. cum uxore ejus concubuerit;*" all these are esteemed felonies, and the latter is expressly so denominated, "*si fecerit feloniam, dominum forte cucurbitando.* And as these contempts, or smaller offences, were felonies or acts of forfeiture, of course greater crimes, as murder and robbery, fell under the same denomination. On the other hand, the lord might be guilty of felony, or forfeit his seignory to the vassal, by the same act as the vassal would have forfeited his feud to the lord. "*Si dominus commisit feloniam, per quam vasallus amitteret feudum si eam commiserit in dominum, feudi proprietatem etiam dominus perdere debet.*" One instance given of this sort of felony in the lord is beating the servant of his vassal, so as that he loses his service; which seems merely in the nature of a civil injury, so far as it respects the vassal. And all these felonies were to be determined, "*per laudamentum sive judicium parium suorum,*" in the lord's court; as with us forfeitures of copyhold lands are presentable by the homage in the court-baron.

Felony.

Felony, and the act of forfeiture to the lord, being thus synonymous terms in the feodal law, we may easily trace the reason why, upon the introduction of that law into England, those crimes which induced such forfeiture or escheat of lands (and, by a small deflexion from the original sense, such as induced the forfeiture of goods also) were denominated *felonies*. Thus it was that suicide, robbery, and rape, were felonies; that is, the consequence of such crimes was forfeiture; till by long use we began to signify by the term of *felony* the actual crime committed, and not the penal consequence. And upon this system only can we account for the cause, why treason in ancient times was held to be a species of felony; viz. because it induced a forfeiture.

Hence it follows, that capital punishment does by no means enter into the true idea and definition of *felony*. Felony may be without inflicting capital puuishment, as in the cases instanced of self-murder, excusable homicide, and petit larceny: and it is possible that capital punishments may be inflicted, and yet the offence be no felony; as in case of heresy by the common law, which, though capital, never worked any forfeiture of lands or goods, an inseparable incident to felony. And of the same nature was the puishment of standing mute, without pleading to an indictment; which at the common law was capital, but without any forfeiture, therefore such standing mute was no felony. In short, the true criterion of felony is forfeiture: for, as Sir Edward Coke justly observes, in all felonies which are punishable with death, the offender loses all his

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Felt. Felt-ſpar.

his lands in fee-ſimple, and alſo his goods and chattels; in ſuch as are not puniſhable, his goods and chattels only.

The idea of felony is indeed ſo generally connected with that of capital puniſhment, that we find it hard to ſeparate them; and to this uſage the interpretations of the law do now conform. And therefore, if a ſtatute makes any new offence felony, the law implies that it ſhall be puniſhed with death, viz. by hanging, as well as with forfeiture: unleſs the offender prays the benefit of clergy; which all felons are intitled once to have, unleſs the ſame is expreſsly taken away by ſtatute.

Felonies by ſtatute are very numerous; and as this work will not admit of a proper enumeration, we muſt refer to the Table of the quarto edition of the Statutes, where they are ſet forth in alphabetical order.

FELT, in commerce, a ſort of ſtuff deriving all its conſiſtence merely from being fulled, or wrought with lees and ſize, without either ſpinning or weaving.

Felt is made either of wool alone, or of wool and hair. Thoſe of French make, $3\frac{1}{2}$ yards long, and $1\frac{1}{4}$ broad, for cloaks, pay each 2 l. 14s. $1\frac{6}{20}$d. on importation; and draw-back 1l. 12s. 3d. on exporting them again.

Felt-Spar, or *Rhombic Quartz*, the *petuntſe* of the Chineſe, a genus of ſiliceous earths, according to Cronſtedt, reſembling the jaſper in moſt reſpects. Its German name is *feld-ſpat*, from the word *feld*, which ſignifies a field, and likewiſe a compartment or regular ſurface. Hence, according to Mr Forſter, the word *feld-ſpat* ſignifies a ſpar compoſed of little compartments of rhombic or other figures. It ſtrikes fire with ſteel, and melts in a violent heat. M. Bayen, who analyſed it by acids, obtained a conſiderable quantity of argillaceous and ſiliceous earths, a ſmaller quantity of magneſia, and a ſtill ſmaller of calcareous earth and iron. It is found either ſparry or cryſtallized. The former ſpecies has ſeveral varieties. 1. White. 2. Reddiſh brown, occurring in the Swediſh and other granites. 3. Pale yellow. 4. Greeniſh, reſembling the ſchorl or cockle ſpar, but leſs fuſible, and more irregular in the figure. The cryſtallized kind is found in an iron mine in Weſtmanland in Sweden, ſeldom in the form of veins, and ſtill more rarely conſtituting the ſubſtance of whole mountains, but generally mixed either with quartz or mica; in which caſe it is called *granite*. When mixed with jaſper, along with ſome particles of quartz, cockle, and horn-blende, it is named *porphyry*.

Another kind of this ſtone, named by M. Bayen *white felt-ſpar*, is found in the duchy of Lorrain. It is of an opaque white colour, ſpotted on the outſide with ochre. It conſiſts of ſhining particles, which give it a ſparry appearance: it is very hard, and ſtrikes fire with ſteel, is affected by acids; and when analyſed by them, appears to contain one half its weight of ſiliceous earth, the other being compoſed of magneſia and iron.

Analogous to the felt-ſpar is that beautiful ſtone named *Labrador-ſtone*, lately brought to Europe. It was diſcovered ſome years ago by the Moravians, who have a colony among the Eſquimaux, in the country of Labrador in North America. It is found of a light or deep-grey colour, but for the moſt part of a blackiſh grey. When held in the light in various poſitions, it diſcovers a variety of colours, ſuch as the blue of lapis lazuli, graſs-green, apple-green, pea-green, and ſometimes, but more ſeldom, a citron-yellow. Sometimes it has a colour between that of red copper and tombuck-grey; at other times the colours are between grey and violet. For the moſt part theſe colours are in ſpots, but ſometimes in ſtripes on the ſame piece. The ſtones are found in pretty large angular pieces, appear foliated when broken, and the fragments of a rhomboidal figure. Their ſpecific gravity is about 2.755, and in other reſpects they agree with the felt-ſpar. Werner informs us, that he has ſeen a piece of felt-ſpar at Gayer, which ſhowed a great variety of colours, but very pale.

Felt-ſpar || Felucca.

Mr Kirwan obſerves on the felt-ſpar, in general, that it is found of many different colours, as white, yellow, red, brown, green, violet, &c. ſometimes cryſtallized in rhombs, cubes, or parallelopipeds; at other times without any regular figure. It breaks like ſpar, but the texture is cloſe though lamellar. The ſpecific gravity, according to our author, is from 2.400 to 2.600, but Mr Gerchard ſays he found it as high as 3.500; in which caſe Mr Kirwan is of opinion that it was mixed with ſome metallic particles. It is harder than the fluor ſpars, but leſs ſo than quartz. It alſo melts without addition more perfectly and eaſily than the fluors, forming a whitiſh glaſs, which does not corrode the crucibles as that from fluor does. It is entirely diſſolved without efferveſcence by the microcoſmic ſalt and by borax; but unites with difficulty to fixed alkalies. In its cryſtallized ſtate it decrepitates in the fire, but not otherwiſe. It is found in looſe maſſes, about two inches long at moſt, without forming either veins or ſtrata. It is alſo found mixed with ſand or clay; or it is ſometimes found imbedded in other ſtones, as granite, &c. One hundred parts of the white ſpar contain 67 of ſiliceous, 14 of argillaceous, 11 of ponderous earth, and 8 of magneſia. According to Mr Kirwan, it is undoubtedly the ſtone uſed by the Saxons, as *petuntſa*, in their porcelain manufactures.

Cronſtedt, who ſuppoſes this ſtone to be of the ſame nature with jaſper, remarks, that "if the rhombic quartz and jaſper were of the ſame ſpecies, that ſort of porphyry which is made up of theſe two bodies ought only to be ranked with the *jaſpers*, inſtead of being placed with the *ſaxa*. It is obſervable, however, in old monuments, which have been long expoſed to the air, that though porphyry had decayed in ſuch a manner as to loſe its poliſh, yet granite, though equally old, and compoſed for the moſt part of rhombic quartz, has preſerved its luſtre. This, however, does not contradict the poſſibility of rhombic quartz being the ſame ſubſtance with the jaſper: the calcareous ſpar, for inſtance, being found to bear the weather, and even fire, better than limeſtone."

FELTRIA, (anc. geog.), a town on the borders of Rhætia towards Italy. Now *Feltri*, in the territory of Venice, on the Piava. E. Long. 12. 16. N. Lat. 46°.

FELUCCA, in ſea-affairs, a little veſſel armed with

fix-

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Female || Fen.

fix oars, frequent in the Mediterranean; which has this peculiarity, that its helm may be applied either in the head or ſtern, as occaſion requires.

FEMALE, (FÆMINA), a term peculiar to animals, ſignifying that ſex which conceives and generates its young within itſelf. See SEX and GENERATION.

FEMALE is alſo applied, figuratively, to things without life, from the reſemblance they bear to the females of animals. Thus we ſay a

FEMALE-Screw. See SCREW.

FEMALE-Flower. See *Femineus Flos.*

FEMALE-Plant. See *Feminea Planta.*

FEMME COVERT, in law, a married woman. See COVERTURE.

FEMME Sole, an unmarried woman, whoſe debts, contracted before marriage, become thoſe of her huſband after it.

A femme-ſole merchant, is where a woman, in London, uſes a trade alone, without her huſband; on which account ſhe ſhall be charged without him.

FEMININE, in grammar, one of the genders of nouns. See GENDER.

The feminine gender is that which denotes the noun or name to belong to a female. In the Latin, the feminine gender is formed of the maſculine, by altering its termination; particularly by changing *us* into *a*. Thus, of the maſculine *bonus equus*, "a good horſe," is formed the feminine *bona equa*, "a good mare;" ſo, of *parvus homo*, "a little man," is formed *parva femina*, "a little woman," &c.

In French, the feminine gender is expreſſed, not by a different termination, but by a different article: thus, *le* is joined to a male, and *la* to a female.

In Engliſh, we are generally more ſtrict, and expreſs the difference of ſex, not by different terminations, nor by different particles, but different words; as boar and ſow, boy and girl, brother and ſiſter, &c. —though ſometimes the feminine is formed by varying the termination of the male into *eſs*; as in abbot, abbeſs, &c.

FEMUR, OS FEMORIS, in anatomy. See there, n° 58.

FEN, a place overflowed with water, or abounding with bogs. See BOG and DRAINING.

Fens are either made up of a congeries of bogs; or conſiſt of a multitude of pools or lakes, with dry ſpots of land intermixed, like ſo many little iſlands.

Several ſtatutes have been made for the draining of fens, chiefly in Kent, Cambridgeſhire, Bedfordſhire, and Lincolnſhire; and by a late act, 11 Geo. II. commiſſioners ſhall be appointed for the effectually draining and preſerving of the fens in the iſle of Ely, who are authoriſed to make drains, dams, and proper works thereon; and they may charge the landholders therein with a yearly acre-tax, and, in default of payment, ſell the defender's lands.

The wet grounds called *fens*, in Lincolnſhire and elſewhere in England, bring many advantages to the inhabitants of thoſe counties. Fowl and fiſh are very plentiful in them. The pike and eels are large and eaſily caught, but they are uſually coarſe. The duck, mallard, and teal, are in ſuch plenty as is ſcarce to be conceived. They are taken by DECOYS in prodigious flocks at a time. They ſend theſe fowl from Lincolnſhire to London, twice a-week, on horſeback, from Michaelmas to Lady-day; and one decoy will furniſh 20 dozen, or more, twice a-week, for the whole ſeaſon in this manner. The decoy-men contract with the people, who bring them to London at a certain rate, and they are obliged to take off their hands the whole number that is catched. Two teal are uſually reckoned equal to one duck; and ſix ducks and 12 teal are accounted a dozen of wild-fowl; and the uſual market price is about 9s. for ſuch a dozen. About midſummer, during the moulting ſeaſon, a great number alſo are deſtroyed by the people in the neighbourhoods. The poor birds at this ſeaſon are neither able to ſwim nor fly well; and the people going in with boats among the reeds where they lie, knock them down with long poles. A little before Michaelmas, vaſt flights of theſe birds arrive at the decoys from other places; they ſoon grow fat in them, and continue there a prey to the maſters or owners, as long as the decoys are unfrozen; but, when they are iced over, they fly away again, and go to the neighbouring ſeas for food.

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The fens alſo abound in a ſort of herbage that is very nouriſhing to cattle. Sheep and horſes always grow fat upon it. Theſe fens are common, and the owners of cattle mark them that they may be known. It is remarkable, that, though all is open, the cattle uſed to one particular ſpot of ground ſeldom leave it, but the owner may always find them in or near the ſame place. The fens have many large and deep drains. In theſe the pike and eel grow to a vaſt ſize: and they are full of geeſe which feed on the graſs; but theſe eat rank and muddy, and may even be ſmelt as ſoon as a perſon comes into the room where they are roaſting. But the people have another very great advantage from theſe birds beſides the eating of them, namely, their feathers and quills; and the produce of theſe is ſo great, that the cuſtom-houſe books in the town of Boſton ſhow, that there are frequently ſent away in one year 300 bags of feathers, each containing a hundred and a half weight. Each pound of feathers brings in the owner twopence; and it may be thought ſtrange by people unacquainted with theſe things, but it is a certain truth, that the owners pull them five or ſix times a year for the feathers, and three times for the quills. Each pulling comes to about a pound, and many people have 1000 geeſe at a time, or more. They are kept at no charge, except in deep ſnowy weather, when they are obliged to feed them with corn.

Oats alſo grow very well in many of the fen countries, and in good ſeaſons bring great increaſe and advantage to the owners. There is alſo another vegetable of great profit to them. This is the *rapum ſilveſtre*; the ſeed of which they call *cole ſeed*; and they make an oil from it of great uſe in trade. They grind the ſeed between two large ſtones, the one ſtanding perpendicularly on the other. The ſtones are made of a ſort of black marble, and are brought from Germany. They ſometimes turn them by ſails, and ſometimes by the drains which carry off the water from the fen lands.

The fens lying low, and being of a vaſt extent, are very ſubject to be overflowed by waters from the neighbouring high countries; and though great care and expence

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Fence. expence is uſed to keep them dry, they are often like a ſea; and the ſheep are obliged to be carried off in boats, and the people to live in their upper rooms, and to be ſupplied with proviſions alſo with boats.

FENCE, in gardening and huſbandry, a hedge, wall, ditch, bank, or other incloſure, made round gardens, fields, woods, &c.

In hot climates, where they have not occaſion for walls to ripen their fruit, their gardens lie open, where they can have a water-fence, and proſpects; or elſe they bound their gardens with groves, in which are fountains, walks, &c. which are much more pleaſing to the ſight than a dead wall: but, in colder countries, we are obliged to have walls to ſhelter and ripen our fruit, although they take away much from the pleaſant proſpect of the garden. Brick-walls are accounted the beſt and warmeſt for fruit: and theſe walls, being built pannelwiſe, with pillars at equal diſtances, will ſave a great deal of charge, in that the walls may be built thinner than if they were made plain without theſe pannels, for then it would be neceſſary to build them thicker every where; and, beſides, theſe pannels make the walls look the handſomer. Stone-walls, however, on account of their durability, are to be preferred to thoſe of brick, eſpecially thoſe of ſquare hewn ſtones. Thoſe that are made of rough ſtones, though they are very dry and warm, yet, by reaſon of their unevenneſs, are inconvenient to nail up trees to, except pieces of timber be laid in them here and there for that purpoſe.

But, in large gardens, it is better to have the proſpect open to the pleaſure-garden; which ſhould be furrounded with a foſſe, that from the garden the adjacent country may be viewed. But this muſt depend on the ſituation of the place: for, if the proſpect from the garden is not good, it had better be ſhut out from the ſight than be open. As alſo, when a garden lies near a populous town, and the adjoining grounds are open to the inhabitants; if the garden is open, there will be no walking there in good weather, without being expoſed to the view of all paſſengers, which is very diſagreeable.

Miller's Gardener's Dictionary. Where the foſſes are made round a garden which is ſituated in a park, they are extremely proper; becauſe hereby the proſpect of the park will be obtained in the garden, which renders thoſe gardens much more agreeable than thoſe that are confined.—In the making theſe foſſes there have been many inventions; but, upon the whole, none ſeem preferable to thoſe which have an upright wall next the garden, which (where the ſoil will admit of a deep trench) ſhould be five or ſix feet high; and, from the foot of this wall, the ground on the outſide ſhould riſe with a gradual eaſy ſlope, to the diſtance of 18 or 20 feet; and where it can be allowed, if it ſlopes much farther it will be eaſier, and leſs perceptible as a ditch, to the eye, when viewed at a diſtance: but, if the ground is naturally wet, ſo as not to admit a deep foſſe, then, in order to make a fence againſt cattle, if the wall be four feet high, and ſlight poſts of three feet high are placed juſt behind the wall, with a ſmall chain carried on from poſt to poſt, no cattle or deer will ever attempt to jump againſt it; therefore it will be a ſecure fence againſt them; and if theſe are painted green, they will not be diſcerned at a diſtance, and at the ſame time the chain will ſecure perſons walking in the garden from tumbling over. Fence

In places where there are no good proſpects to be obtained from a garden, it is common to make the incloſure of park-paling; which, if well performed, will laſt many years, and has a much better appearance than a wall: and this pale may be hid from the ſight within, by plantations of ſhrubs and evergreens; or there may be a quick-hedge planted within the pale, which may be trained up, ſo as to be an excellent fence by the time the pales begin to decay.

Fences round parks are generally of paling; which if well made of winter-fallen oak, will laſt many years. But a principal thing to be obſerved, in making theſe pales, is not to make them too heavy; for, when they are ſo, their own weight will cauſe them to decay: therefore the pales ſhould be cleft thin; and the rails ſhould be cut triangular, to prevent the wet lodging upon them; and the poſts ſhould be good, and not placed too far aſunder. If theſe things are obſerved, one of theſe pales will laſt, with a little care, upwards of 40 years very well. The common way of making theſe fences is, to have every other pale nine or ten inches above the intermediate ones; ſo that the fence may be ſix feet and a half high, which is enough for fallow deer; but, where there are red deer, the fence ſhould be one foot higher, otherwiſe they will leap over.

Some incloſe their parks with brick walls; and in countries where ſtone is cheap, the walls are built with this material; ſome with, and others without, mortar.

A kitchen-garden, if rightly contrived, will contain walling enough to afford a ſupply of ſuch fruits as require the aſſiſtance of walls, for any family; and this garden, being ſituated on one ſide, and quite out of ſight of the houſe, may be ſurrounded with walls which will ſcreen the kitchen-garden from the ſight of perſons in the pleaſure-garden; and, being locked up, the fruit will be much better preſerved than it can be in the public garden; and the having too great a quantity of walling is often the occaſion that ſo many ill-managed trees are frequently to be ſeen in large gardens.

The height of garden walls ſhould be 12 feet, which is a moderate proportion; and, if the ſoil be good, it may in time be well furniſhed with bearing-wood in every part, eſpecially that part planted with pears, notwithſtanding of the branches being trained horizontally from the bottom of the walls.

With regard to the more common kinds of fences, Mr Anderſon gives the following directions, in his Eſſays on Agriculture, &c. "The fences that are moſt univerſally employed, are either ſtone-dikes or hedges (A). Dikes, if well built, as effectually preſerve a field from the intruſion of domeſtic animals, as any other kind of fence whatever; but they afford little warmth

(A) *Dike* is a term employed to denote any kind of wall reared for the purpoſe of incloſing a field and nothing elſe.

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Fence. warmth or ſhelter to the field: whereas hedges, if good, anſwer both theſe purpoſes equally well. But the moſt material diſtinction between dikes and hedges is, that dikes are in their higheſt degree of perfection as ſoon as they are reared, and from that moment begin to tend towards decay; ſo that the perſon who builds this kind of fence immediately receives the full benefit thereof: whereas hedges, being at firſt weak and tender, ſtand in need of attention and care, and do not become a fence for ſeveral years after they are planted; and, as they continue to increaſe in ſtrength, and gradually acquire a higher and higher degree of perfection, it is long before they begin to fall towards decay; ſo that they are, in general, infinitely more durable than dikes, although they are longer of becoming of uſe to the perſon who plants them. Which of theſe two kinds of fences may, upon the whole, be moſt eligible, muſt, in general, be determined by the circumſtances and views of the poſſeſſor of the ground to be incloſed. If he is a tenant who has a ſhort leaſe, without a proſpect of getting it renewed; or, if he has immediate occaſion for a complete fence; it will be, in general, moſt prudent in him to make choice of dikes, if the materials for rearing theſe are at hand: but, if there is any probability that his poſterity may reap any advantage from theſe incloſures, it will be almoſt always more for his advantage to make choice of hedges.

"A dike built of freeſtone and lime will be almoſt as durable as a hedge; although, in general, it will neither be ſo cheap nor agreeable. But dry-ſtone dikes, unleſs built of the fineſt quarried ſtone, are of ſuch a periſhable nature, as to be hardly ever worth the expence of rearing; and never, excepting where the field that you would wiſh to incloſe has plenty of ſtones upon its ſurface, which you are under a neceſſity of carrying away before the field can be improved. In this ſituation a man may, in ſome meaſure, be excuſed, if he ſhould be tempted to put them into dikes; becauſe the carriage of theſe ſtones may be ſaid to coſt him nothing: and he may, perhaps, be at ſome loſs how to diſpoſe of them in any other manner. But, in all other circumſtances, it is very bad economy to rear fences of this kind, as ſeal dikes can always be built at one-fourth of the expence that theſe would coſt—will anſwer all purpoſes equally well; and, if carefully built, will be kept in repair for any number of years at as ſmall an expence as they could be.

"The want of durability generally complained of in theſe dikes is owing to their bad conſtruction. The greateſt part of them are made of a conſiderable thickneſs, with a ditch on each ſide; the heart of the dike being made up with the earth that is taken from theſe ditches; and only a thin wall, on each ſide, is built of ſolid ſeal from top to bottom; the conſequence of which is, that as the looſe earth that is thrown into the middle of the dike ſubſides much more than the ſeal on each ſide, the top of the dike ſinks down; and, of courſe, the two ſide-walls are preſſed too much upon the inſide, ſo as to bilge (ſwell) out about the middle, and quickly crumble down to duſt. To avoid this inconvenience, I have always choſen to build my dikes of this ſort thinner than uſual: they being only three feet and a half thick at the bottom; one foot, or a very little more, at top; and five feet high: taking care to have them built in ſuch a manner, as that every ſod (ſeal), from top to bottom binds the joinings of the others below it, with as much accuracy as the bricks in a well built wall. The uppermoſt courſe of ſeal is cut a little longer than thoſe that are immediately below it, and placed with the graſſy ſide uppermoſt, ſo as to project a little on each ſide; which not only helps to throw the water a little off the dike, but alſo to prevent ſheep or cattle from attempting to jump over it ſo readily as they otherwiſe might do. At the foot of the dike, on each ſide, is dug a ſmall ditch, about a foot and a half or two feet deep; leaving a ledget of a few inches broad on each ſide, that the dike may not be undermined by the crumbling down of the looſe earth into the ditch. Theſe ditches not only help to give the dike an additional height, and keep its foundation dry; but are alſo of uſe to prevent cattle from coming cloſe to it and rubbing upon it, or tearing it down with their horns, which they are very apt to do if this precaution be omitted. The earth that is taken out of the ditches may be thrown outwards into the place that was occupied by the ſeal that has been taken to build the dike; and if the field is in graſs, a few ſeeds may be ſowed upon it, and it will ſoon be covered as well as the reſt of the field. Fence.

"By having the joints bound in every direction, the fabric is rendered much firmer than it could be by any irregular manner of working, while it is at the ſame time more eaſily reared. If the ground is ſoft, and the ſeal riſe well, I get a fence of this kind done for one penny halfpenny *per* yard; but, if it is not good to work, a little more than that muſt be allowed. As to the time that a fence of this kind may ſtand without needing any repair, I cannot ſpeak with certainty, as it is not long ſince I fell into this method of building them. The oldeſt has juſt now ſtood ten years, and ſeems to be nearly as firm as when firſt built. I have ſeen ſome walls of poor cottages which have been built ſomewhat after this manner, that have been good after ſtanding 40 or 50 years: but their durability depends greatly upon the nature of the ſeal of which they are formed. The beſt is that which is taken from poor ground of a ſpongy quality, which is generally covered with a ſtrong ſward of coarſe benty graſs. And, in ſituations where this can be had, I would have no heſitation in recommending this as the cheapeſt and beſt temporary fence that could be reared.

"The greateſt inconvenience that attends this ſpecies of fence, is the danger it runs of being torn down by the horns, or waſted away by the rubbing, of cattle upon it; which they will ſometimes do notwithſtanding of the ditches. This may be effectually prevented by planting a row of ſweet-briar (*eglantine*) plants between the firſt and ſecond courſe of ſeal when the dike is built, which will not fail to grow with luxuriance, and in a ſhort time defend the dike from every attack of this kind. But if ſheep are to be kept in the incloſures, this plant ought not, on any account, to be employed; for, as that animal naturally flies to the fences for ſhelter in ſtormy weather, the prickles of the ſtraggling branches of the briar will catch hold of the wool, and tear it off in great quantities, to the great detriment of the flock and loſs of the proprietor. In theſe caſes, if the poſſeſſor of the ground is not afraid of the bad conſequences that may be dreaded from the

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Fence. spreading of whins (*furze*), it would be much better to ſcatter a few of the ſeeds of this plant along the ledget at the foot of the dike, which would quickly become a preſervative for it, and be otherwiſe of uſe as a green food for his ſheep during the winter ſeaſon. But, before he ventures to ſow this plant, let him remember, that where it is once eſtabliſhed, it will hardly fail to ſpread through the adjoining fields, and can hardly be ever afterwards thoroughly rooted out.

"I have often imagined that this kind of fence might be greatly improved both in beauty and ſtrength, by planting a row of ivy plants beneath the firſt courſe of ſeal in building the dike; which would, in a ſhort time, climb up the ſides of the dike and cover the whole with a cloſe and beautiful network of woody fibres; covered with leaves of the moſt beautiful verdure; which would tend to preſerve the dike from being eat away by froſt, and other viciſſitudes of weather. And when it is arrived at the top, it would there ſend out a number of ſtrong woody branches, forming a ſort of hedge, that would afford ſome ſhelter to the fields, and break the force of the wind conſiderably; but as I never have yet had an opportunity of trying the experiment, I only here offer it as a probable conjecture. I have ſeen a garden-wall that had been built of ſtone and clay, ornamented and ſtrengthened in this way. I have had the experience of ivy growing well upon a dry ſtone-dick: and have likewiſe ſeen it growing up the walls, and covering whole cottages built of ſeal; which have by this means been preſerved entire, long after the walls that had been naked have fallen to decay. But, not having had plants of this kind at hand, I have not had an opportunity of trying it in the manner propoſed; although, I think, there is the greateſt reaſon to hope for ſucceſs.

"Whins (*furze*) have been often employed as a fence when ſowed upon the top of a bank. They are attended with the convenience of coming very quickly to their perfection, and of growing upon a ſoil on which few other plants could be made to thrive: but, in the way that they are commonly employed, they are neither a ſtrong nor a laſting fence. The firſt of theſe defects may, in ſome meaſure, be removed, by making the bank upon which they are ſowed (for they never ſhould be tranſplanted) of a conſiderable breadth; in order that the largeneſs of the aggregate body, conſidered as one maſs, may in ſome meaſure make up for the want of ſtrength in each individual plant. With this view, a bank may be raiſed of five or ſix feet in breadth at the top, with a large ditch on each ſide of it; raiſing the bank as high as the earth taken from the ditches will permit; the ſurface of which ſhould be ſowed pretty thick with whin-ſeeds. Theſe will come up very quickly; and in two or three years will form a barrier that few animals will attempt to break thro', and will continue in that ſtate of perfection for ſome years. But the greateſt objection to this plant as a fence is, that, as it advances in ſize, the old prickles always die away; there being never more of theſe alive at any time upon the plant, than thoſe that have been the produce of the year immediately preceding: and theſe thus gradually falling away, leave the ſtems naked below as they advance in height; ſo that it very ſoon becomes an exceeding poor and unſightly fence; the ſtems being entirely bare, and ſo ſlender withal as not to be able to make a ſufficient reſiſtance to almoſt any animal whatever. To remedy this great defect, either of the two following methods may be adopted. The firſt is, to take care to keep the bank always ſtored with young plants; never allowing them to grow to ſuch a height as to become bare below: and it was principally to admit of this, without loſing at any time the uſe of the fence, that I have adviſed the bank to be made of ſuch an unuſual breadth. For if one ſide of the hedge be cut quite cloſe to the bank, when it is only two or three years old, the other half will remain as a fence till that ſide become ſtrong again; and then the oppoſite ſide may be cut down in its turn; and ſo on alternately as long as you may incline: by which means the bank will always have a ſtrong hedge upon it without ever becoming naked at the root. And as this plant, when bruiſed, is one of the moſt valuable kinds of winter-food yet known for all kinds of domeſtic animals *, the young tops may be carried home and employed for that purpoſe by the farmer; which will abundantly compenſate for the trouble of cutting, and the waſte of ground that is occaſioned by the breadth of the bank.

* See *Agriculture*, n° 47.

"The other method of preſerving a hedge of whins from turning open below, can only be practiſed where ſheep are kept; but may be there employed with great propriety. In this caſe it will be proper to ſow the ſeeds upon a conical bank of earth, ſhoved up from the ſurface of the ground on each ſide without any ditches. If this is preſerved from the ſheep for two or three years at firſt, they may then be allowed free acceſs to it; and, as they can get up cloſe to the foot of the bank upon each ſide, if they have been accuſtomed to this kind of food, they will eat up all the young ſhoots that are within their reach, which will occaſion them to ſend out a great many lateral ſhoots; and theſe being continually browſed upon, ſoon become as cloſe as could be deſired, and are then in no ſort of danger of becoming naked at the root, although the middle part ſhould advance to a conſiderable height.

"The fences hitherto mentioned are only intended to preſerve fields from the intruſion of cattle; but, on ſome occaſions, it is neceſſary to have a fence that would even reſiſt the efforts of men to break through it: as around bleaching-fields, orchards, &c.; the want of which often ſubjects the proprietor of ſuch fields to very diſagreeable accidents. And, as ſuch a fence might, on ſome occaſions, be procured at no great expence or trouble, it were to be wiſhed that the method of doing this were more generally known than it is at preſent. To effectuate this, it is neceſſary to begin by trenching up or ploughing a large belt all around the field you mean to incloſe, of 40 or 50 feet or more in breadth, if you find it convenient: the outer edge of which ſhould be incloſed by a good dike, or a ditch and hedge. This belt ſhould be kept in culture one year, and well manured, if your ſituation will admit of it; and laid up before winter in ſuch a manner that no water may be allowed to lodge upon it; and planted in the winter-time all over with plants of eglantine ſo thick as not to be above two feet from one another; and between theſe put a good number of young birch plants not above two years old, interſperſed with hazels, oak, aſh, rawn (wild ſervice), and other trees that you think will thrive upon your ſoil; together with

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Fence. thorns, hollies, brambles, and wood-bine (honeyſuckle): and having then fenced it from cattle, and kept down the weeds that may riſe upon its ſurface by the hoe, as long as you can conveniently get acceſs into it, leave it afterwards to nature. If this is done, and your ſoil be not extremely bad, the belt in a very few years will be entirely filled with a cloſe buſh of trees, ſo intermixed with the bending branches of the eglantine, and bound together by the trailing ſhoots of the bramble and wood bine, that no animal above the ſize of a cat could penetrate; eſpecially when it is of ſuch a depth as I have recommended.

"The firſt hint that I got for a fence of this kind was from a ſmall thicket of bruſhwood that I had planted for ornament, pretty much in the manner above deſcribed; which in a ſhort time became ſo much interwoven with the ſweet-briar, that it was impoſſible to find any acceſs into it. But as all kinds of trees and ſhrubs, if planted very cloſe upon one another, become naked at the root when they arrive at any conſiderable ſize, care ſhould be taken to prevent it from ever coming to that ſtate, by cutting it down whenever it becomes in danger of being open at the root. And as it would be improper ever to leave the field entirely defenceleſs, it is a great advantage to have the belt as broad as it conveniently may be, ſo that the one half of it may be a ſufficient fence; by which means, we will have it in our power to cut down the inſide and the outſide of the belt alternately, ſo as ſtill to keep the thicket young, and never to want at any time a ſufficient fence; and the bruſh-wood that this afforded at each cutting would, in almoſt every ſituation, yield ſuch a revenue as would do much more than indemnify the proprietor for the rent of the ground that was occupied by this fence. And if the field was in ſuch a ſituation as required ſhelter, ſome trees might be allowed to grow to their full ſize about the middle, without any inconvenience, if the belt were of a ſufficient breadth.

"There is one other ſpecies of fencing as uſeful as any of thoſe already mentioned, which is in general much leſs underſtood, and more difficult to execute properly, that deſerves here to be taken notice of; *viz.* the method of ſecuring the banks of rivers from being waſhed away by the violence of the ſtream, and of preventing the damages that may otherwiſe be occaſioned by the ſwelling of the waters.

"It frequently happens that, when a river runs in a bed of rich vegetable mould, the leaſt accident that may chance to divert the ſtream towards any particular part of the bank, cauſes it to ſweep away large tracts of fine ground, to the very great detriment of the proprietor, as well as the public; as this fine mould is uſually carried to the ſea, and the place that the water leaves to occupy the new bed that it thus forms for itſelf is generally of a much worſe quality; conſiſting chiefly of ſtones, ſand, and gravel. In ſome caſes, where the whole force of the current is quite cloſe to the bank, and the materials neceſſary for fencing it are not to be found, it may perhaps be impoſſible or very difficult totally to prevent this evil; but, for the moſt part, it admits of a cure that can be obtained at a pretty moderate expence.

"Theſe ravages are always greateſt where the bank riſes perpendicularly to a pretty conſiderable height above the ordinary ſurface of the water, and never at thoſe places where the banks ſhelve down gradually towards the water's edge: for, when the river is ſwelled to a great height by rains, and runs with a force and rapidity greater than uſual, it ſtrikes violently againſt theſe perpendicular banks that directly oppoſe its courſe, which being compoſed of earth quite bare and uncovered, are eaſily ſoftened by the water, and quickly waſhed away; ſo that the upper part of the bank being thus undermined, falls by its own weight into the river, and is carried off in prodigious quantities: whereas at thoſe parts of the bank that ſhelve gradually downwards to the water's edge, when the river riſes to any conſiderable height, it gently glides along its ſurface; which being defended by the matted roots of the graſs with which it is covered, ſcarcely ſuſtains any damage at all; and is nearly the ſame after the water has retired within its banks as before the inundation. Theſe facts, which no one who has beſtowed the leaſt attention to this ſubject can fail to have obſerved, clearly point out, that the firſt and moſt neceſſary ſtep towards a cure, is to level down the edge of the bank that is next to the water, ſo as to make it ſlope gradually down towards the river. If the bank is very high, and you have no other particular uſe for the earth that muſt be taken from it, the eaſieſt method of diſpoſing of it, will be to throw it into the river: but, in whatever manner you may diſpoſe of the earth, the ſlope of the bank muſt be continued until the inner edge of it is as low as the ſurface of the water at the drieſt time of the year, and be made to aſcend gradually upwards from the water with an eaſy ſlope, till it comes to the level of the ground, or at leaſt riſes to ſuch a height as that the water never exceeds. This operation ought to be performed as early in ſummer as poſſible, and ſhould be either immediately covered with turf, pared from the ſurface of ſome field that has a very ſtrong ſward upon it, taking care to lay theſe in ſuch a manner as to be in as little danger as poſſible of being waſhed away by any accidental flood that might happen before they had grown together; or, if the turf of this kind cannot be eaſily had, it ſhould be ſowed very thick with the ſeeds of ſome ſmall matt-rooted graſs, that ſhould be kept in readineſs for this purpoſe (c).

"If the ſtream has not been extremely rapid at the foot of the bank, ſome of the earth that was thrown into the water will be allowed to ſubſide to the bottom, and will there form a bank of looſe ſoft earth, which will be of great uſe afterwards in preventing the face of the bank under water from being waſhed away; but, in order to ſecure this bulwark effectually for the future, the ſurface of this ſoft earth ought to be inſtantly ſtuck full of the roots of bog-reeds, flags, water-ſpiderwort, ruſhes, and other matt-rooted aquatic plants; which, if allowed to remain till they have once ſtruck root, will afterwards form a barrier that nothing will ever be able to deſtroy. But, if the ſtream be too rapid to admit of this, and the bank of ſoft earth is much deeper than the ſurface of the water, it will be of uſe to fill up the breaſt of the bank with looſe ſtones carelеſsly

(c) The creeping meadow-graſs, *poa repens*, is a proper graſs for this purpoſe.

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Fence, Fencing.

carelefsly thrown in, till they rife near the furface of the water; which would moft effectually fecure it againft any future encroachments, if the bank is floped away above.

"If it fhould fo happen that ftones cannot be eafily got for this purpofe, the only refource which in this cafe remains, is to dig the bank fo low, that at the undermoft edge, it may be always below the furface of the water, and carry it out in this way for a confiderable diftance, and then ftick the whole furface that is below the water full of matt-rooted aquatic plants; which will in a great meafure, if not entirely, defend it from any future encroachments. This bank ought to continue to fhelve downwards even where it was below water, and thofe aquatics that will grow in the greateft depth of water be planted on the innermoft brink, and the others behind them. The water-fpiderwort will grow in four feet depth of water, and the roots of the common yellow-flowered water-iris forms fuch a ftrong and compact covering upon the furface of the foil on which it grows, as would defend it from being affected by the water almoft as well as if it were a rock: it is likewife an advantage attending this plant, that it grows upon a firm bottom, and chiefly delights in running water.

"If the ftratum of foft earth is not fo deep as to reach to the furface of the water, and lies upon a ftratum of rock or hard gravel, there will be no occafion for throwing in ftones of any kind. But, as it is difficult to unite the vegetable mould to any of thefe ftrata, there will always be fome danger of its feparating from thefe in violent inundations; and if the water once get an entry, it will not fail to grow larger and larger by every future inundation. To prevent this inconvenience, it will be neceffary, after you have floped the earth away till you reach the gravel or rock, to cover the place where the edge of the earth joins the inferior ftratum with a good many fmall ftones, if they can be found; fowing between them the feeds of any kind of plants that you think are moft likely to thrive, which have ftrong matted roots with as fmall and flexible tops as poffible. You will eafily obferve, that from the impoffibility of ever making earth adhere firmly to ftone of any kind, it muft always be an improper practice to face the banks of a river to a certain height with ftone which is coped at top with earth."

For the moft proper methods of raifing hedges of different kinds, fee HEDGE.

FENCE-Month, the month wherein deer begin to fawn, during which it is unlawful to hunt in the foreft.

It commences 15 days before mid-fummer, and ends 15 days after it. This month, by ancient foreflers, is called *defence-month*.

FENCING, the art of making a proper ufe of the fword, as well for attacking an enemy as for defending one's felf.

This art is acquired by practifing with foils, called in Latin *rudes*; whence fencing is alfo denominated *gladiatura rudiaria*.—It is one of the exercifes learnt in the academies (fee EXERCISE and ACADEMY); and is an accompliſhment both agreeable and ufeful:—Agreeable, as it affords gentlemen a noble and diſtinguiſhed amuſement:—Uſeful, as it forms their body; and furniſhes them with the faculty of defence, whether it be of their honour or their life, when the one or the other is attacked by thoſe turbulent and dangerous perſons whoſe correction is of ſervice to ſociety in general. Fencing, Fenelon.

Pyrard aſſures us, that the art of fencing is ſo highly eſteemed in the Eaſt-Indies, that none but princes and noblemen are allowed to teach it. They wear a badge or cognizance on their right arms, called in their language *eſaru*; which is put on with great ceremony, like the badges of our orders of knighthood, by the kings themſelves.

Fencing is divided into two parts, *ſimple* and *compound*.

Simple is that performed directly and nimbly, on the ſame line; and is either offenſive or defenſive.—The principal object of the firſt, is whatever may be attempted, in puſhing or making paſſes, from this or that point, to the moſt uncovered part of the enemy. The ſecond conſiſts in parrying and repelling the thruſts aimed by the enemy.

The *compound* includes all the poſſible arts and inventions to deceive the enemy, and make him leave that part we have a deſign on bare and unguarded, upon finding we cannot come at it by force, nor by the agility of the ſimple play. The principal means hereof are, on the offenſive ſide, feints, appeals, claſhings, and entanglings of ſwords, half-thruſts, &c.; and, on the defenſive, to puſh in parrying. Of all which a detail would be here uſeleſs, as they are only to be underſtood and acquired from perſonal inſtructions conjoined with practice.

FENELON (Francis de Salignac de la Motte), was of an ancient and illuſtrious family, and born at the caſtle of Fenelon in Perigord in 1651. In 1689, he was appointed tutor to the dukes of Burgundy and Anjou; and in 1695 was conſecrated archbiſhop of Cambray. After this preferment, a ſtorm roſe againſt him, that obliged him to leave the court for ever, occaſioned by his performance intitled, *An Explication of the Maxims of the Saints concerning the Interior Life*; in which he was ſuppoſed to favour the extravagant notions of Madam Guyon, and the principles of Quietiſm. A controverſy on this occaſion was for ſome time carried on between him and M. Boſſuet, biſhop of Meux: which terminated in an appeal to the pope; when his holineſs condemned the archbiſhop's book, by a brief dated March 12th, 1699. Some friends indeed pretend, that there was more of court-policy than religious zeal in this affair: but be this as it may, the archbiſhop ſubmitted patiently to this determination; and, retiring to his dioceſe of Cambray, acquitted himſelf punctually in all the duties of his ſtation, and led a moſt exemplary life. The work that gained him the greateſt reputation, and which will render his memory immortal, is his *Adventures of Telemachus*; the ſtyle of which is natural, the fictions well contrived, the moral ſublime, and the political maxims tending all to the happineſs of mankind. Hence it is thought, as the printing of this work was ſtopped at Paris, that the prelate's hereſy was in politics inſtead of religion; and though his diſgrace was prior to this work, he had, while he was tutor to the young princes, taught them the ſame principles aſſerted and exemplified in Telemachus. Fenelon died in 1715; and a collection of

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Fennel || Feodal.

of all his religious works was afterwards printed at Rotterdam, under the care of the marquis de Fenelon his grand-nephew, when ambaſſador to the States-General.

FENNEL, in botany. See ANETHUM.

FENTON (Sir Geoffrey), privy-counſellor and ſecretary in Ireland during the reigns of queen Elizabeth and king James I. is well known for his tranſlation of *Guicciardin's Hiſtory of the Wars of Italy*, dedicated to queen Elizabeth in 1579. He died at Dublin in 1608; after having married his daughter to Mr Boyle, afterward the great Earl of Corke.

FENTON (Elijah), deſcended from an ancient family, was born at Shelton near Newcaſtle, but in what year is uncertain. He was the youngeſt of 12 children, and was intended for the miniſtry; but embracing principles contrary to the government, while at Cambridge, he became diſqualified for entering into holy orders. After he quitted the univerſity, he was ſecretary to the earl of Orrery; but ſeems to have ſpent the moſt of his life amongſt his friends and relations, and uſed to pay an annual viſit to his elder brother, who enjoyed an eſtate of L. 1000 a-year. He was a man of great tenderneſs and humanity, enjoyed the faireſt reputation, and was much eſteemed by Mr Pope; who, when he died in 1730, paid him the tribute of a very elegant epitaph. He publiſhed a volume of poems in the year 1717; and in 1723 was acted his tragedy of Mariamne, built upon her ſtory collected from Joſephus in the third volume of the Spectator.

FENUGREEK. See TRIGONELLA.

FEOD, or FEUD, is defined to be a right which a vaſſal hath in lands or ſome immoveable thing of his lord's, to uſe the ſame, and take the profits thereof hereditarily, rendering unto the lord ſuch feodal duties and ſervices as belong to military tenure, &c. and the property of the ſoil always remaining to the lord.

FEODAL, of or belonging to a FEUD or FEE.

FEODAL Syſtem, the conſtitution of FIEFS or FEUDS.

About 12 centuries ago, this ſyſtem was ſo univerſally received in Europe, that Sir Henry Spelman calls it *the law of nations in our weſtern world*. Hence it deſerves our attention in a particular manner; a knowledge of the different feuds being indiſpenſably requiſite for a proper underſtanding either of the civil government of our own country, or the laws by which its landed property is regulated.

1 Origin of feuds.

The military policy of the Celtic or northern nations, known by the names of *Goths*, *Vandals*, *Franks*, *Hunns*, and *Lombards*, furniſhed the original conſtitution or ſyſtem of feuds. Theſe people pouring out in vaſt multitudes from the ſame *officina gentium* or "ſtorehouſe of nations," over-ran all the European countries on the declenſion of the Roman empire. They brought the feudal ſyſtem along with them from the countries out of which they emigrated; and, ſuppoſing it to be the moſt proper method of ſecuring their new conqueſts, they introduced it into their more ſouthern colonies. Feodal.

According to this ſyſtem, the victorious general allotted conſiderable tracks of land to his principal officers; while they, in like manner, divided their poſſeſſions among the inferior officers, and even thoſe common ſoldiers who were thought to be the moſt deſerving. Allotments of this kind were named *feoda*, *fiefs*, *fees*, or *feuds*, from a combination of words, in the language of theſe barbarians, ſignifying a reward or ſtipend beſtowed on certain conditions (A). The condition upon which theſe rewards were given was, that the poſſeſſors ſhould faithfully ſerve the perſon from whom they were received, both at home and abroad, in the military way. To this they engaged themſelves by a *juramentum fidelitatis*, or oath of fealty*; in the event of a breach of which, either by not performing the ſervice agreed upon, by deſerting their lord in time of battle, &c. the lands were to return to their original poſſeſſor.

* See the Article Feodal Tenure.

2 General nature of the feodal aſſociation.

Thus the poſſeſſors of feodal allotments became intereſted in the defence of them; and not only the receivers, but thoſe who gave them, were equally and mutually bound to defend their poſſeſſions, none of them being able to pretend any right but that of conqueſt. For this purpoſe, government and ſubordination were abſolutely neceſſary; it being impoſſible to conduct any ſyſtem of defence where every thing was tumultuous and irregular. Every perſon, therefore, who was a feudatory, *i. e.* who had received lands, was bound to do every thing in his power to defend the lord of his fee; while, on the other hand, the latter was no leſs ſubordinate to his immediate ſuperior; and ſo on to the prince himſelf. In like manner a reciprocal bond of defence exiſted down from the prince to the loweſt feodiſts.

Such were the foundations on which the feodal ſyſtem was properly eſtabliſhed; and the natural conſequence was, a military ſubjection throughout the whole community. The prince could always collect an army of feudatories ready to defend not only the kingdom in general, but the particular poſſeſſions of each perſon; and the propriety of this conſtitution was ſoon apparent in the ſtrength which theſe newly erected kingdoms acquired, and the valour with which their conqueſts were defended.

3 Of allodiality.

Beſides theſe feodal grants, however, which were held only on the terms of military ſervice above mentioned, there were others called *allodial*, which were given upon more enlarged principles. To theſe every free man had a title; and could not only claim his territory as well as the reſt, but diſpoſe of it at his pleaſure

(A) We are informed by Pontopiddan, that ODH in theſe northern languages is the ſame with *proprietas*, and ALL with *totum* in the Latin. Hence, among the northern nations, he tells us, that ODHALL ſignifies *right*: and hence we may conjecture, that the UDAL right in Finland is derived*. By tranſpoſing theſe two northern ſyllables, we form the word ALLODH; whence we have the etymology of the *allodium* or *abſolute* property claimed by the holders of fiefs or feuds; and by combining ODH, ſignifying "property," with the word *fee*, ſignifying, "a conditional ſtipend or reward," we have the word FEODH, ſignifying, "a property given by way of ſtipend or reward upon a certain condition."

* See *Macdowall's Inſtit.* part 2.

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Feodal. pleaſure (B); and this freedom was denominated *allodiality*. Theſe allodials, however, were not exempted from military ſervice. A part of their freedom conſiſted in liberty to go to the wars; for this, in the barbarous times we ſpeak of, was the only way to acquire any degree of renown. Only the ſlaves were deſtined to follow the arts of peace; while every free perſon was not only at liberty to defend his country, but under an obligation to do it in caſe of any urgent neceſſity.

4 Feodal and national militia. Thus there was a feodal and a national militia. The free people only were allowed to poſſeſs property; the *feudal vaſſals* conſtituted the army, properly ſo called; while the national militia was compoſed of the allodial proprietors. This allodiality, however, was not confined to landed property, but included likewiſe moveable eſtates or money; ſo that proprietors of the latter kind were obliged alſo in times of danger to bear arms and appear in the field.

5 Different ſituations of the feodal and of the allodial proprietor. Between the feodal and allodial proprietors, however, there was this farther difference, that the latter had no concern with any private quarrels which might take place among the lords themſelves; ſo that they were never obliged to appear in the field unleſs when called forth by the ſovereign againſt the enemies of the nation at large. This circumſtance we might ſuppoſe to be an advantage, but it ultimately operated otherwiſe; becoming the means of changing the allodial right into a feodal tenure. For ſome time the holders of fiefs had an eminent advantage over the allodial proprietors. This was owing to the imperfection of government in thoſe days; ſo that the nobles had it in their power to revenge their own quarrels, while the weak were equally expoſed to the inſults of both parties. The lord and his vaſſals therefore were always formidable; but the allodial proprietors had ſcarce any means of defending themſelves. The reaſon of this was, in the firſt place, that the law did not allow them to commit any hoſtilities; and in the next, they were too diſtant and unconnected to form any proper league for mutual defence; and hence proceeded the neceſſity already hinted at, of converting allodial property into feudal tenure. This was indeed owing in a great meaſure to the abſurdity and violence of the times, by which gifts of property, burthened with ſervice, and which might return to the perſon who granted them, were rendered ſuperior in value to the abſolute and unconditional poſſeſſion of a ſubject. Other conſiderations, however, beſides that juſt mentioned, contributed to produce the ſame effect. As in thoſe dark ages no right exiſted but what had its origin in conqueſt, it thence followed, that the greateſt conqueror or warrior was the moſt honourable perſon. The king, in whom the whole exploits of the community centred, as being their head, was the moſt honourable perſon; all others derived from him that portion of honour which they enjoyed, and which was moſt nicely adjuſted in proportion as they approached him. Allodial proprietors therefore having no pretenſions of this kind, were treated with contempt as a kind of poltroons. From this diſagreeable ſituation they wiſhed to free themſelves, by converting their allodial property into feudal tenures; while the princes, ſuppoſing it their intereſt to extend thoſe tenures as much as poſſible, diſcouraged the allodial poſſeſſions.

6 Converſion of allodium into tenure. As the feodiſts ſupported the importance of the nation and dignity of the monarch, it was not thought proper to allow the allodial proprietors any greater compenſations than what were given to vaſſals in ſimilar caſes. Thus they were expoſed to continual mortifications in the courts of juſtice; they were neglected by the king; denied ſufficient protection from the laws; expoſed not only to continual inſults, but to have their property on all occaſions deſtroyed by the great: ſo that they were without reſource except from the feodal tenures, and were obliged even to ſolicit the privileges which were beſtowed in other caſes on vaſſals. In theſe unhappy circumſtances, they were glad to yield up their lands to any ſuperior whom they thought moſt agreeable, and to receive them back from him as a feudal gift.

Feodal.

Thus

(B) The author of *A View of Society in Europe*, has traced the remote ſources of the feodal laws in an elegant and ſpirited manner (Book I. Chap. II. Sect. I.) Tacitus informs us, that the individuals of each of the German nations cultivated by turns a track of land proportionable to their number, for the uſe of the whole; after which each individual received ſuch an allotment of the cultivated track as his dignity ſeemed to require. Theſe nations had not altered their political principles at the time they over-ran the Roman empire; and hence the provinces of it were then divided after the ſame manner. The moſt conſiderable allotment was beſtowed on the king, as being the moſt dignified perſon in the community, and this allotment was ſtyled his *domain*; while the ſhares of citizens and warriors, which were likewiſe in proportion to the merit or dignity of each, conſtituted what was called *allodiality*. But as it often happened that all the land was not exhauſted by theſe partitions, what remained was conſidered as the property of the community, and in the barbaric codes was called the *lands of the fiſc*. In ſuch German nations as had thus obtained a ſettlement, it was neceſſary that there ſhould be a more cloſe connection betwixt the ſovereign and the chiefs, as well as between the chiefs and people, than in others. This was effected by means of the lands of the *fiſc*; for of theſe the ſovereign took poſſeſſion, dealing them out to the chiefs under the burthen of appearing in arms whenever he ſhould pleaſe to call; while the chiefs in like manner dealt out lands to thoſe called their *retainers*, who were alſo obliged to ſupply them with military aſſiſtance in caſes of neceſſity. Hence a political ſyſtem was founded, which had a prodigious effect on ſociety in all thoſe countries where it prevailed. The intention and tendency of this ſyſtem was to render the nation independent both at home and abroad; for while the people were all armed in their common defence, individuals were alſo properly guarded againſt the attacks of deſpotiſm. The power of the chiefs, who formed a regular nobility, was a counterpoiſe to that of the ſovereign; while the number of the retainers and vaſſals, conſtituting the greatneſs and power of the nobility, was a proper barrier againſt ariſtocratical oppreſſion; for a chief who oppreſſed his vaſſals evidently acted againſt his own intereſt.

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Feodal. Thus the landed property was every where changed into feudal tenures, and fiefs became univerſal (c).

For ſome time the feodal ſyſtem was not only uſeful in itſelf, but honourable in its principles; but this continued no longer than while the importers of it into Europe adhered to their original ſimple and noble maxims. During that period, the lord exerciſed his bounty to the vaſſal, which the latter repaid by acts of gratitude; ſo that the intercourſe betwixt them was

7 The feodal incidents. of the moſt tender and affectionate kind; and this gave riſe to what are called the *feodal incidents*.

The expectants of fiefs were educated in the hall of the ſuperior, while the tenures were precarious or only for life: and even when they became hereditary, the lord took care of the ſon and eſtate of his deceaſed vaſſal; not only protecting his perſon, but taking charge of his education, and directing the management of his affairs. He took pleaſure in obſerving his approach to maturity; and when he came of age, never failed to deliver to him the lands, with the care of which he had been entruſted, and which he had been careful to improve. This was called the *incident of wardſhip*. Feodal.

The incident of *relief* was founded upon the gratitude of the vaſſal; who, upon entering on his fief, brought a preſent to his lord, as an acknowledgment of his care of him during the early part of his life, and in order to conciliate his future regard.

The incident of *marriage* proceeded alſo upon the principle of gratitude on the part of the vaſſal. The latter, conſcious of the favours he had received, did not chooſe to ally himſelf with a family inimical to his chief: while the ſuperior himſelf, ambitious to aggrandiſe and augment the importance of his family, ſought how to find the moſt advantageous match for his vaſſal.

Sometimes the ſuperior himſelf was reduced in his circumſtances by war or other accidents: but from whatever cauſe his diſtreſs proceeded, even though it had ariſen from his own extravagance or prodigality, or when only deſtitute of means to ſupport his ambition or grandeur, his vaſſals were bound to ſupport and relieve

(c) It has been an object of inquiry to the learned, in what nation of barbarians fiefs had their origin? But it is probable, that they took place in all of theſe nations nearly about the ſame time, on the ſame principles, and were continued by reaſon of a ſimilarity of manners, conqueſts, &c. ſo that we cannot aſcribe the prevalence of them to imitation.

In France, we find mention made of fiefs as early as the age of Childebert. They were introduced into Italy by the Lombards; among whom the cuſtoms and laws relating to fiefs ſeem very early to have made rapid advances*. They were introduced into Spain before the invaſion of the Moors or Saracens in the year 710. Lands were granted for ſervice and attachment among the Goths; among whom alſo the perſon who received the gift was the retainer of him who granted it. If he refuſed his ſervice, the grant was forfeited, and he was ſaid to receive it *in patrocinio*: he alſo ſwore fealty to his lord; and on this footing the national militia was regulated †. There can be very little doubt that the feodal law was known in England in the Saxon times, as is mentioned in the text ‡. In Scotland, however, the hiſtory of fiefs is ſtill more uncertain than any where elſe; which has been aſcribed partly to the mutilated ſtate of the Scottiſh records, and partly to the want of able antiquaries in the nation. But, according to a late writer ||, allodiality and feudality have exiſted ever ſince the foundation of the Scottiſh monarchy, and have moſt probably ariſen from a ſimilarity of the manners and cuſtoms in Scotland to thoſe of other nations. It has indeed been ſuppoſed, that theſe cuſtoms were introduced from ſome foreign model by Malcolm II. According to ſome, they were introduced directly from England; and the policy of Malcolm in eſtabliſhing them has been highly extolled: but, according to our author, there is no foundation for any notion of that kind. Both the opinions juſt mentioned either directly aſſert or imply, that the feudal maxims were introduced into this country upon the principle of imitation; but it is very improbable that they could be imported from one people to another, on account of their exceſſive contrariety to the common uſages and precepts of government among mankind. It muſt undoubtedly have been very abſurd, if not altogether impracticable, to tranſplant the feudal tenures when the grants of land were precarious, or depending entirely on the will of the prince, to a country which had never known ſuperiority or vaſſalage. This would have required an alteration of all the orders of ſociety from the king to the peaſant; while the whole chain of cuſtoms, as well as the juriſdiction of the kingdom, both high and low, muſt have ſuſtained a correſponding alteration, in order to conform them to the new ſyſtem. It is likewiſe obvious, that no conqueſt could be made on purpoſe to obtain a ſettlement by any nation who had already received the knowledge of fiefs. The eſtabliſhment of them implied, that the people had already a fixed and ſettled reſidence; and accordingly hiſtory does not furniſh us with any account of a nation among whom fiefs were known, who ever migrated from the country they already poſſeſſed, to ſeek for one in which they might ſettle. Feudal inſtitutions muſt have originated wherever they have been obſerved to flouriſh. Scotland was formerly a feudal kingdom, and we know pretty nearly the time when the fiefs were hereditary there: but in that form they could not be introduced by the ſovereign; and there was not any nation among whom fiefs were already known who conquered, or made an eſtabliſhment by conqueſt, in Scotland. Fiefs therefore muſt have *gradually* advanced to ſuch a ſtate of perfection. The progreſs they made may be likewiſe eaſily pointed out. At firſt they were precarious, or at the pleaſure of the lord; afterwards they were granted for life; then for a courſe of years longer than the natural life of a man; and, laſtly, they became hereditary, which was their moſt perfect ſtage. This progreſs has been obſerved in every country where feodal tenures exiſt; and the ſame muſt have been known in Scotland, though in conſidering it we are neceſſarily carried back to periods of remote antiquity; for as fiefs were hereditary as early as the time of Malcolm II. they muſt have been in their precarious ſtate ſeveral centuries before.

* *Giannone Hiſt. of Naples*, book iv. ſect. 3.

† *L. L. Wiſigoth*, lib. v. tit. 3. lib. iv. tit. 7. l. xx

‡ See alſo *Whitaker's Hiſt. of Manchester.*

|| *Stuart's Obſervat. on the Laws and Conſtitution of Scotland.*

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lieve him according to their circumſtances; and this was called the *incident of aid*.

The incident of *eſcheat* took place on the part of the vaſſal, when, through cowardice, treachery, or any remarkable miſbehaviour, he rendered himſelf unworthy of his fief. In that caſe, the taking it from him, and giving it to one more worthy, was called an *eſcheat*.

8 Happineſs of the feodal aſſociation.

While the lords and vaſſals thus vied with one another in mutual acts of friendſhip and benevolence, univerſal happineſs, liberty, and activity, were diffuſed thro' the ſociety. The vaſſals behaved courteouſly towards the retainers, who were immediately below them; while they again were courted by the lords as conſtituting their importance and ſtrength; the lords, laſtly, giving a like importance and dignity to the ſovereign himſelf. Thus a regular, powerful, and compact ſyſtem of government took place; an unanimity and attention pervaded the various departments of ſtate; ſo that while the ſubjects were free, the nation at large was formidable.

9 Its declenſion.

During this happy ſtate of affairs, the members of the national aſſembly in every country in Europe appeared there in arms, whether they came perſonally or by their repreſentatives. Such particularly was the caſe under the Anglo-Saxon government; and the happineſs they at that time enjoyed made the oppreſſion and tyranny of the Normans appear the more intolerable. In proceſs of time, however, the ſtate of ſociety began to ſuffer a remarkable alteration. The high and diſintereſted notions, from which the happineſs above mentioned took its origin, declined; the romantic ideas of chivalry * ceaſed; and much more intereſted notions of property came in their ſtead. The ſeparation of the intereſts of the lords from their vaſſals was the firſt ſtep towards the deſtruction of the feodal ſyſtem. Thus the *incidents*, which, as has juſt now been mentioned, promoted their happineſs, did the very reverſe. Property being now looked upon as a diſtinction ſuperior to perſonal merit, naturally introduced the moſt mercenary views. In conſequence of theſe the infant *ward*, the care of whom was wont to be conſidered as a ſacred and honorary truſt, was now only looked upon as a mean of procuring emolument to the ſuperior. The latter now regarded the profits of his vaſſals as ſo many diminutions of his own wealth. Inſtead of taking care to improve the eſtate of his ward as formerly, he impoveriſhed it; not only neglecting the education of the heir, but offering inſults to himſelf; inſomuch that the relations of the unfortunate vaſſal were frequently obliged to ranſom from the avaricious ſuperior both his perſon and effects. By merchandiſe of this kind the coffers of princes were filled, and wardſhips let out to ſtrangers, who might exerciſe their rapacity with greater freedom. When the vaſſal at laſt attained the years of maturity, he came to the poſſeſſion of his lands without any of that joy and feſtivity which uſually took place on the occaſion. He received an inheritance waſted and deſtroyed, while new grievances daily preſented themſelves to augment the horrors of his ſituation. All the *incidents*, which in former times were ſo many expreſſions of gratitude on the part of the vaſſal, were now changed into taxes which might be exacted at the pleaſure of the lord. Before the vaſſal was inveſted in his land, the ſuperior exacted from him a certain ſum or other gift, to be meaſured only by his own rapacity; and in caſe of delay or inability to pay this demand, the ſuperior continued in poſſeſſion of the eſtate. Such ſcandalous oppreſſion could not but produce the greateſt diſcontent and clamour. Applications were made to the law without ſucceſs; nor were even the laws regarded which were fabricated on purpoſe for their relief. The incident of *marriage* now proved a ſource of the moſt dreadful oppreſſion. The lord aſſumed a right of marrying his vaſſal to whom he pleaſed; and he not only exerted this right himſelf, but would ſell it to a ſtranger, or allow the vaſſal to buy it himſelf; while the penalty annexed to a marriage without the conſent of the ſuperior involved no leſs puniſhment than the loſs of the eſtate itſelf, or ſome grievous infliction as for a crime of the firſt magnitude. The caſe was ſtill worſe with a female ward; whoſe beauty and accompliſhments became a ſource of gain to the ſuperior, or were ſacrificed to pleaſe his whim or caprice: ſo that her relations were frequently obliged to buy from him the privilege of marrying her to the perſon ſhe or they thought moſt proper. In like manner the *aid*, which was formerly a voluntary gift from the vaſſal in caſes of diſtreſs happening to his lord, now became an unavoidable tax. An aid formerly was demanded when the eldeſt daughter of the ſuperior was married, when his eldeſt ſon was knighted, or when the ſuperior himſelf was taken priſoner in battle. Theſe were the only legal cauſes of making a demand of this kind: but in the ſubſequent times of degeneracy, the moſt frivolous pretences were every day made uſe of by the prince to oppreſs the lords, and by the lords to oppreſs their vaſſals; demanding ſubſidies at pleaſure, which their inferiors were always obliged to comply with. Laſtly, the *eſcheat*, which in former times took place only in caſes of cowardice, treachery, or ſome other heinous crime, was now inflicted on the moſt trifling occaſions. If the vaſſal happened to be too long in attending the court of his ſuperior to take the oath of fealty; if he committed any action which could in the leaſt be conſtrued an infringement of the oath; if he neglected to give his lord warning of any misfortune which he might ſuppoſe was about to befal him; revealed any thing concerning him; made love to his ſiſter or daughter, &c.; or even if he ſhould grant a tenure of land to another perſon in form different from that in which he held his own; all theſe, nay others ſtill more ridiculous, were judged ſufficient reaſons for the ſuperior to ſeize on the eſtate of the vaſſal, and involve him and his family in ruin.

* See *Chivalry*, and *Knights*.

10 The perverſion of its incidents.

11 Oppreſſed ſituation of the vaſſals.

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12 Conſequent degeneracy of the feodal militia.

Notwithſtanding theſe oppreſſions, however, the vaſſal was ſtill obliged to ſubmit to his lord; to own him as his ſuperior; and even, in appearance, to pay him the ſame reſpect as formerly when the greateſt unanimity and cordial affection ſubſiſted between them. Still he was obliged to perform the ſame military ſervice; becauſe a failure in that reſpect would have ſubjected him to a forfeiture of lands according to the original agreement. A vaſt difference, however, now took place in the valour and activity which inſpired the army. The vaſſals, forced into the field with deſponding hearts, were indifferent as to the ſucceſs of the cauſe in which they were engaged, and frequently obſtructed inſtead of forwarding the operations of the field.

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field. Hence the ſovereign found himſelf embarraſſed; and, though nominally at the head of a martial and powerful people, was frequently unable to effect any thing by reaſon of the mutual hatred and diſſenſion which every where prevailed.

13 Expedient for its recovery.

Thus the feodal ſtates of Europe became unnaturally weak: a remedy was neceſſary; and it is remarkable, that the ſame remedy was applied all over the continent. This was, in ſhort, the making fiefs hereditary, which till now had only been granted for a long term of years; and, in return, burdening the lands with a certain number of ſoldiers, which were not to be refuſed upon any pretence whatever. Hence was derived the

14 Invention of knight-ſervice.

tenure of *knight-ſervice*. A certain portion of land, burdened with the ſervice of one ſoldier or knight, was called a *knight's-fee*; and thus an eſtate, furniſhing any number of ſoldiers, was ſaid to contain as many knight's fees; ſo that now the manours, baronies, &c. became powerful according to the number of ſoldiers they were bound to furniſh. In the grants from the crown, the nobility were obliged to furniſh a certain number of ſoldiers for the ſervice of the ſovereign; and in thoſe from the nobility to their vaſſals, the like ſervice was required. Even the commons who had grants from the crown furniſhed a certain proportion of knights. The force of the nation was called into action by grants *in capite*, or from the ſovereign and nobility. A numerous and powerful army was inſtantly aſſembled, and at once ready for action. Of this army the king was the general, the nobility the officers, and the vaſſals ſoldiers; the whole being exactly arranged, and capable of entering upon any expedition without the leaſt delay.

Thus a remedy was found in ſome meaſure for the weakneſs of the feodal ſovereigns: but though the knights-tenure could accompliſh this, it could not bring back the former affection and cordiality which ſubſiſted between the various ranks of people. On the contrary, by uniting them more firmly to one another by legal ties, it rendered matters rather worſe. The oppreſſion originating from the operation of the feodal *incidents*, ſtill continued with unremitting violence. The grants of knights-tenure were attended with the ſame oaths of homage and fealty; the ſame incidents of relief, wardſhip, marriage, aid, and eſcheat, with the feodal tenures. The princes promiſed to abate ſomewhat of their rigour in demanding the feodal perquiſites, but did not keep their word. Laws were occaſionally promulgated, and for ſome time had an effect; but palliatives ſoon became ineffectual, and a new ſtate of weakneſs began to commence. Feodal-Syſtem.

15 Two eras in the hiſtory of fiefs.

The two remarkable eras in the feodal hiſtory are, the time before the invention of knight-ſervice (D), and that during which it continued. Fiefs were in a ſtate of fluctuation from the deſtruction of the Roman empire till the ninth century; but they were rendered perpetual in France about the year 877, and were generally become ſo in every country of Europe about the beginning of the tenth. Du Cange, *voce Militia*, gives us an example of a knight-fee in the year 880. By the year 987, when Hugh Capet was raiſed to the throne of France, knight-ſervice was become general all over Europe, and was introduced into England after having made its appearance in other countries (E). In England, however, there have been ſeveral doubts and inquiries among the learned concerning the introduction of the feodal laws. Many are of opinion, that they were firſt introduced by William the Conqueror; and, conſequently, that they were entirely unknown to the Anglo-Saxons: but others think, that they exiſted among the latter in the ſame form under which they were continued by the Normans. Dr Stuart is of opinion, that the Saxons who ſettled in England could not be ſtrangers to fiefs. He ſuppoſes the conformity of manners, which undoubtedly prevailed between the Saxons and other barbarians, a ſufficient proof that the hereditary grant of land, as well as the fluctuating ſtate of feodal tenures which preceded it, were known to the former. Collateral proofs are derived from the ſpirit and tenure of the Anglo-Saxon laws, but eſpecially from the grants of hereditary eſtates on condition of military ſervice (F). The condition of fiefs under the Anglo-Saxons was very different from what it was afterwards. In their times we find no mention made of thoſe oppreſſions of which ſo much notice has already been

16 Doubts concerning the introduction of the feodal laws into England.

(D) For the difference between the knights produced by this ſervice and the more ancient ones, or knights of honour, ſee the article KNIGHT.

(E) Dr Stuart informs us, that it appears from the records of Malcolm IV. in 1153, that knights-ſervice was known in Scotland, and that it was not a novelty at that time. The ſame author thinks it even probable, that it was known in the time of David I.

(F) The uſe of entails was known to the Anglo-Saxons; and this practice, as well as the ſucceſſion to allodial eſtates, muſt have contributed very much to eſtabliſh hereditary fiefs. This opinion ſeems alſo to be confirmed by the accounts we have of the great power of many of the nobility among the Anglo-Saxons, and the natural tendency that fiefs muſt have, in the courſe of things, to become perpetual, though analogical arguments cannot entirely be depended upon in this caſe. There is indeed poſitive evidence that the territory which anciently conſtituted the kingdom of Mercland belonged to Ethelred as an hereditary fief and earldom. The grant was given him by Alfred when he married his daughter Ethelfleda: and it is likewiſe atteſted by Camden, that in the time of Ethelred the earldom of Leiceſter was an inheritance, and the regular ſucceſſion of its earls is ſtill known. We are informed alſo by creditable hiſtorians, that Bernicia and Deireland were feodal and inheritable earldoms among the Saxons. The ſame was true of the county of Cumberland when poſſeſſed by the Scottiſh monarchs. This laſt appears from the Saxon Chronicle; in which the grant was conveyed by Edmund king of England to Malcolm of Scotland in the following terms: "Edmundus rex totam Cumberland prædavit et contrivit, et *commendavit* eam Malcomo regi Scotiæ; hoc pacto, quod *in auxilio* ſibi foret terra et mari." From the uſe of the word *commendavit*, indeed, Spelman takes occaſion to ſay, that a feodal homage was not intended: but the contrary may be proved by the original Saxon from which the foregoing

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been taken; and this may eaſily be accounted for from the alteration of the feodal ſpirit in different ages. During the time that a warm and generous affection ſubſiſted between the feodal ſuperiors and vaſſals, the incidents were marks of generoſity on the one part, and gratitude on the other; but as ſoon as a variance had taken place, by reaſon of the intereſted diſpoſition which the introduction of luxury produced, the ſame incidents became ſources of the moſt flagrant oppreſſion. This was remarkably the caſe in the time of William the Conqueror; and, during the reign of king John, matters were come to ſuch a criſis, that the people every where complained loudly, and demanded the reſtoration of the laws of Edward the Confeſſor(G). "What theſe laws of Edward the Confeſſor were (ſays Mr Hume), which the Engliſh every reign during a century and an half deſired ſo paſſionately to have reſtored, is much diſputed by antiquarians; and our ignorance of them ſeems one of the greateſt defects of the ancient Engliſh hiſtory." Dr Stuart has offered an explanation; but this is in fact no more than a conjecture, that "by the laws or cuſtoms of the Confeſſor, that condition of felicity was expreſſed which had been enjoyed during the fortunate ſtate of the feodal aſſociation. The cordiality, equality, and independence, which then prevailed among all ranks in ſociety, continued to be remembered in leſs proſperous times, and occaſioned an ardent deſire for the revival of thoſe laws and uſages which were the ſources of ſo much happineſs."

17 Inſufficient ſolution of them by Dr Stuart.

18 Diſtinction concerning fiefs in the Anglo-Saxon and the Anglo Norman times.

Beſides the great diſtinction (of which an account has already been given) between the ſtate of fiefs under the Anglo Saxons and under the Normans, they were no leſs diſtinguiſhed by the introduction of knight-ſervice. Hitherto the refinement of the Engliſh had been obſtructed by the invaſion of the Danes, and the inſular ſituation of the kingdom; but after the Norman conqueſt the fiefs were made perpetual. Still, however, the knight-fee and knight-ſervice were altogether unknown. William, the ſixth prince who enjoyed the duchy of Normandy, was well acquainted with every thing relating to fiefs; for that duchy had experienced all the variety incidental to them from the time of its being granted to Rollo by Charles the Simple in the year 912, to the year 1066, when William was put in poſſeſſion of England by the battle of Haſtings.

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On his acceſſion to the throne, a number of forfeitures took place among thoſe who had followed the fortune of Harold. Their eſtates were to be diſpoſed of at the pleaſure of the conqueror; and it was natural to ſuppoſe that he would follow the method practiſed in his own country. Hence the origin of knight-ſervice in England. A grant of land, to any perſon whatever, was eſtimated at a certain number of knights fees; and each of theſe required the ſervice of a knight. The grants of lands were even renewed to the old tenants under this tenure; ſo that by degrees the whole military people in the kingdom acquieſced in it. To accompliſh this, DOMESDAY *Book* is ſuppoſed to have been compiled, which contained an exact account of all the landed property of the kingdom. Hence it is to be concluded, not that William introduced fiefs into England, as ſome have imagined, but that he brought them to their ultimate ſtate of perfection by the introduction of knight-ſervice. This is evident from the laws enacted during his reign. In theſe it is not only mentioned that knight-ſervice was enacted, but that it was done expreſsly with the conſent of the common council of the nation; which at that time was equivalent to an act of parliament (H).

19 Introduction of knight-ſervice into England.

The invention of knight-ſervice proved generally agreeable: for as only few of the Anglo-Saxon fiefs were hereditary, the advancement of the reſt to perpetuity, under the tenure of knight-ſervice, muſt have been accounted an acquiſition of ſome importance; as not only augmenting the grandeur and dignity of the ſovereign, but ſecuring the independence of the ſubject, and improving his property. In the happy ſtate of the feodal aſſociation, there was indeed no neceſſity for the knight's fee; but when the diſcordance and oppreſſion ſo often mentioned began to take place, it became then neceſſary to point out particularly every duty of the vaſſal, as well as of the lord; and this was fully done by the invention of knight-ſervice. The nobles poſſeſſed duchies, baronies, and earldoms; which extenſive poſſeſſions were divided into as many fees, each of them to furniſh a knight for the ſervice of the king, or of the ſuperior: ſo that every feudal ſtate could command a numerous army

20 Idea of the feodal militia.

going is a Latin tranſlation; and the word, according to ſeveral learned critics, ſignifies feodal homage with the moſt ſtrict propriety. Thus Du Cange informs us, that *commendare ſe alicui* was the general expreſſion for *faire l'hommage a un ſuſerain.*

(G) The laws which are now extant under the name of Edward, are generally allowed to be of doubtful authenticity; nor are they, even ſuppoſing them to be genuine, of any uſe in anſwering the preſent queſtion. They determine indeed the exiſtence of fiefs among the Anglo-Saxons: and Dr Stuart is of opinion, that the compilation which goes under the name of this prince, though poſterior to the date it bears, nevertheleſs merits greater attention than has uſually been beſtowed upon it. M. Honard, a foreign lawyer, is the lateſt writer who has made it his ſtudy; but he is better acquainted with the Norman than the Anglo-Saxon cuſtoms.

(H) The following law of William the Conqueror not only makes expreſs mention of the knight's fee and ſervice, but alludes to a former law of William and his parliament, by which this tenure was actually eſtabliſhed. "Statuimus etiam et firmiter præcipimus, ut omnes comites, et barones, et milites, et ſervientes, et univerſi "liberi homines totius regni noſtri prædicti, habeant et teneant ſe ſemper bene in *armis*, et in *equis*, ut decet "et oportet, et quod ſint ſemper prompti et bene parati ad *ſervitium ſuum integrum* nobis explendum, et pera- "gendum, cum ſemper opus adfuerit, ſecundum quod NOBIS debent de *feodis et tenementis ſuis* de jure facere, "et ſicut illis ſtatuimus per *commune conſilium* totius regni noſtri prædicti, et dedimus et conceſſimus in feodo jure "hæreditario." *LL. Guill.* c. 58.

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and militia to support and defend it in case of any emergency. The knights were also bound to assemble in complete armour whenever the superior thought proper to call, and to hold themselves in readiness for action whenever the king or superior found it convenient to take the field: so that thus the militia might be marched at the shortest notice to defend or support the honour of the nation.

The knights were usually armed with an helmet, sword, lance, and shield; and each was besides obliged to keep a horse. This last requisite was owing to the contempt into which the infantry had fallen through the prevalence of tournaments and luxuries of various kinds, though it was by means of the infantry that the barbarians had originally distinguished themselves in their wars with the Romans, and become able to cope with these celebrated warriors. All proprietors of fees or tenants by knight-service fought on foot: the cavalry were distinguished by the name of *battle*; and the success of every encounter was supposed to depend on them alone. They only were completely armed; the infantry, being furnished by the villages under the jurisdiction of the barons, had at first only bows and slings; though afterwards they were found worthy of much greater attention.

21 Its inefficacy and corruption.

While the feodal association remained in perfection, the superior could at any time command the military service of his vassals; but in the subsequent degeneracy this service could neither be depended upon when wanted, nor was it of the same advantage when obtained as formerly. The invention of knight-service tended in a great degree to remedy this inconvenience. Those who were possessed of knights fees were now obliged to remain 40 days in the field at their own expence; and this without exception, from the great crown vassals to the smallest feudatories; but if longer service was required, the prince was obliged to pay his troops. In those times, however, when the fate of nations was frequently decided by a single battle, a continuance in the field for 40 days was sufficient for ordinary occasions.

Thus matters seemed once more to be restored nearly to their former state. It was now, as much as ever, the interest of the nation to act with unanimity in its defence, not only against foreign enemies, but against the tyranny of the prince over his subjects, or of one part of the subjects over the other. New inconveniencies, however, soon began to take place, owing to the gradual improvements in life and the refinement of manners. From the first institution of military service, a fine had been accepted instead of actual appearance in the field. In the times of barbarity, however, when men accounted rapine and bloodshed their only glory, there were but few who made an offer of this compensation; but as wealth and luxury increased, and the manners of people became softer, a general unwillingness of following the army into the field became also prevalent. A new tenure, called *escuage*, was therefore introduced; by which the vassal was only obliged to pay his superior a sum of money annually instead of attending him into the field *. Hence originated taxes and their misapplication; for as the king was lord paramount of the whole kingdom, it thence happened that the whole escuage money collected throughout the nation centred in him. The princes then, instead of recruiting their armies, frequently filled their coffers with the money, or dissipated it otherwise, hiring mercenaries to defend their territories when threatened with any danger. These being composed of the dregs of the people, and disbanded at the end of every campaign, filled all Europe with a disorderly banditti, who frequently proved very dangerous to society. To avoid such inconveniencies, standing armies were introduced, and taxations began to be raised in every European kingdom. New inconveniencies arose. The sovereigns in most of these kingdoms, having acquired the right of taxation, as well as the command of the military power, became completely despotic: but in England the sovereign was deprived of this right by Magna Charta, which was extorted from him, as related under the article ENGLAND, n° [153]; so that, though allowed to command his armies, he could only pay them by the voluntary contributions of the people, or their submitting to such taxations as were virtually imposed by themselves.

Feodal-System ii Feralia.

22 Rise of standing armies, &c.

FEOFFMENT, in law, (from the verb *feoffare* or *infeudare*, "to give one a feud"); the gift or grant of any corporeal hereditament to another. He that so gives, or enfeoffs, is called the *feoffer*; and the person enfeoffed is denominated the *feoffee*.

This is plainly derived from, or is indeed itself the very mode of, the ancient feodal donation; for though it may be performed by the word "enfeoff" or "grant," yet the aptest word of feoffment is *do* or *dedi*. And it is still directed and governed by the same feodal rules; insomuch that the principal rule relating to the extent and effect of the feodal grant, *tenor est qui legem dat feudo*, is in other words become the maxim of our law with relation to feoffments, *modus legem dat donationi*. And therefore, as in pure feodal donations, the lord, from whom the feud moved, must expressly limit and declare the continuance or quantity of estate which he meant to confer; *ne quis plus donasse præsumatur, quam in donatione expresserit*; so, if one grants by feoffment lands or tenements to another, and limits or expresses no estate, the grantee (due ceremonies of law being performed) hath barely an estate for life. For, as the personal abilities of the feoffee were originally presumed to be the immediate or principal inducements to the feoffment, the feoffee's estate ought to be confined to his person and subsist only for his life; unless the feoffer, by express provision in the creation and constitution of the estate, hath given it a longer continuance. These express provisions are indeed generally made; for this was for ages the only conveyance, whereby our ancestors were wont to create an estate in fee-simple, by giving the land to the feoffee, to hold to him and his heirs for ever; though it serves equally well to convey any other estate of freehold.

But by the mere words of the deed the feoffment is by no means perfected: there remains a very material ceremony to be performed, called *livery of seisin*; without which the feoffee has but a mere estate at will. See SEISIN.

FERÆ, in zoology, an order of quadrupeds. See ZOOLOGY.

FERALIA, in antiquity, a festival observed among

* See the particular consequences of this under the article *Knight-Service*.

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Feralia || Feretrum.

mong the Romans on February 21ſt, or, according to Ovid, on the 17th of that month, in honour of the manes of their deceaſed friends and relations.

Varro derives the word from *inferi*, or from *fero*; on account of a repaſt carried to the ſepulchres of ſuch as the laſt offices were that day rendered to. Feſtus derives it from *ferio*, on account of the victims ſacrificed. Voſſius obſerves, that the Romans called death *fera*, "cruel," and that the word *feralia* might ariſe thence. —Macrobius Saturn. lib. i. cap. 13. refers the origin of the ceremony to Numa Pompilius. Ovid, in his Faſti, goes back as far as Æneas for its inſtitution. He adds, that on the ſame day a ſacrifice was performed to the goddeſs Muta, or Dumb; and that the perſons who officiated were an old woman attended with a number of young girls.

During the continuance of this feſtival, which laſted eleven days, preſents were made at the graves of the deceaſed, marriages were forbidden, and the temples of the gods ſhut up. While the ceremonies continued, they imagined that the ghoſts ſuffered no puniſhments in hell, but that their tormentors allowed them to wander round their tombs, and feaſt upon the meats which their ſurviving friends had prepared for them.—For a more particular account of the offerings and ſacrifices and feaſts for the dead, ſee INFERIÆ and SILICERNIUM.

Sometimes at the feralia public feaſts were given to the people at the tombs of the rich and great by their heirs or particular friends.

FER DE FOURCHETTE, in heraldry, a croſs having at each end a forked iron, like that formerly uſed by ſoldiers to reſt their muſkets on. It differs from the croſs-fourché, the ends of which turn forked; whereas this has that ſort of fork fixed upon the ſquare end. See HERALDRY.

Fer de Moulin, Milrinde, Inke de Moulin, in heraldry, is a bearing ſuppoſed to repreſent the iron-ink, or ink of a mill, which ſuſtains the moving mill-ſtone.

FERDINAND V. king of Spain, called *the Catholic*, which title was continued to his ſucceſſors. He married Iſabella of Caſtile, by which that kingdom was united to the Spaniſh crown. This illuſtrious couple laid the foundation of the future glory and power of Spain. The conqueſt of Granada, and the diſcoveries of Chriſtopher Columbus, make this reign a celebrated era in the hiſtory of Spain. He died in 1516, aged 63. See (*Hiſtory* of) SPAIN.

FERENTARII, in Roman antiquity, were auxiliary troops, lightly armed; their weapons being a ſword, bow, arrows, and a ſling.

FERENTINUM, (anc. geog.), a town of the Hernici in Latium, which the Romans, after ſubduing that nation, allowed to be governed by its own laws. Now *Feretino*, an epiſcopal city in the Campania of Rome. E. Long. 14. 5. N. Lat. 41. 45.

FERENTUM, or FORENTUM, (anc. geog.), a town of Apulia in Italy. Now *Forenza*, in the Baſilicata of Naples.

FERETRIUS, a ſurname of Jupiter, *a ferendo*, becauſe he had aſſiſted the Romans; or *a feriendo*, becauſe he had conquered their enemies under Romulus. He had a temple at Rome built by Romulus. It was there that the ſpoils called *opima* were always carried.

FERETRUM, among the Romans, the bier uſed in carrying out the bodies of the dead, which duty was performed by the neareſt male relations of the deceaſed: thus, ſons carried out their parents, brothers their ſiſters, &c.

Ferg || Ferguſon.

FERG, or FERGUS, (Francis Paul), a charming landſcape-painter, was born at Vienna in 1689, and there learned the firſt principles of his art. He ſucceſſively practiſed under Hans Graf, Orient, and Thiele. This laſt, who was painter to the court of Saxony, invited him to Dreſden to inſert ſmall figures in his landſcapes. Ferg thence went into Lower Saxony, and painted for the duke of Brunſwick and for the Gallery of Salzdahl. From Germany he went to London, where he might have lived in the higheſt eſteem and affluence, if, by an indiſcreet marriage, he had not been ſo effectually depreſſed, that he was ever after involved in difficulties. The neceſſities which aroſe from his domeſtic troubles, compelled him to diminiſh the prices of his paintings, in order to procure an immediate ſupport; and as thoſe neceſſities increaſed, his pictures were ſtill more ſunk in their price, though not in their intrinſic value. By a ſeries of misfortunes he was over-run with debts; and to avoid the purſuit of his creditors, he was conſtrained to ſecrete himſelf in different parts of London. He died ſuddenly in the ſtreet one night as he was returning from ſome friends about the year 1738, having not attained his 50th year; and left four children. This pleaſing artiſt, Mr Walpole obſerves, had formed a manner of his own from various Flemiſh painters, though reſembling Poelemburg moſt in the enamelled ſoftneſs and mellowneſs of his colouring: but his figures are greatly ſuperior; every part of them is ſufficiently finiſhed, every action expreſſive. He painted ſmall landſcapes, fairs, and rural meetings, with the moſt agreeable truth; his horſes and cattle are not inferior to Wouvermans; and his buildings and diſtances ſeem to owe their reſpective ſoftneſs to the intervening air, not to the pencil. More faithful to nature than Denner, he knew how to omit exactneſs, when the reſult of the whole demands a leſs preciſion in parts. The greateſt part of his works are in London and Germany; and they now bear ſuch a price as is the moſt indubitable evidence of their real merit. He alſo etched well with aquafortis; and his prints of that kind are eſteemed by the curious.

FERGUS, the name of three kings of Scotland. See (*Hiſtory* of) SCOTLAND.

FERGUSON (James), an eminent experimental philoſopher and mechanic, was born in Scotland, of very poor parents. At the earlieſt age his extraordinary genius began to exert itſelf. He firſt learned to read, by overhearing his father teach his elder brother: and he had made this acquiſition before any one ſuſpected it. He ſoon diſcovered a peculiar taſte for mechanics, which firſt aroſe on ſeeing his father uſe a lever. He purſued this ſtudy a conſiderable length, even whilſt very young; and made a watch in woodwork, from having once ſeen one. As he had no inſtructor, nor any help from books, every thing he learned had all the merit of an original diſcovery; and ſuch, with infinite joy, he believed it to be. As ſoon as his age would permit, he went to ſervice; in which he met with hardſhips, which rendered his conſtitution feeble through life. Whilſt he was ſervant to a farmer (whoſe

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Ferguſon, Feriæ.

(whoſe goodneſs he acknowledges in the modeſt and humble account of himſelf which he prefixed to his laſt publication), he frequently contemplated the ſtars; and began the ſtudy of aſtronomy, by laying down, from his own obſervations only, a celeſtial globe. His kind maſter, obſerving theſe marks of his ingenuity, procured him the countenance and aſſiſtance of his ſuperiors. By their help and inſtructions, he went on gaining farther knowledge, and was ſent to Edinburgh. There he began to take portraits; an employment by which he ſupported himſelf and family for ſeveral years, both in Scotland and England, whilſt he was purſuing more ſerious ſtudies. In London he firſt publiſhed ſome curious aſtronomical tables and calculations; and afterwards gave public lectures in experimental philoſophy, which he repeated (by ſubſcription) in moſt of the principal towns in England, with the higheſt marks of general approbation. He was elected a Fellow of the Royal Society, without paying for admiſſion (an honour ſcarcely ever conferred on a native); and had a penſion of 50l. *per ann.* given him, unſolicited, by our gracious king, at his acceſſion, who had heard lectures from him, and frequently ſent for and converſed with him on curious topics. He alſo received ſeveral preſents from his majeſty, the patron of real merit. To what a degree of conſideration Mr Ferguſon mounted by the ſtrength of his natural genius, almoſt every one knows. He was univerſally conſidered as at the head of aſtronomy and mechanics in this nation of philoſophers. And he might juſtly be ſtyled ſelf-taught, or rather heaven taught; for in his whole life he had not above half a year's inſtruction at ſchool. He was a man of the cleareſt judgment, and the moſt unwearied application to ſtudy; benevolent, meek, and innocent in his manners as a child: humble, courteous, and communicative; inſtead of pedantry, philoſophy ſeemed to produce in him only diffidence and urbanity,—a love for mankind and for his Maker. His whole life was an example of reſignation and Chriſtian piety. He might be ſaid to be an enthuſiaſt in his love of God, if religion, founded on ſuch ſubſtantial and enlightened grounds as his was, could be ſtyled enthuſiaſm. He died in 1776.

FERIÆ, in Roman antiquity, holidays, or days upon which they abſtained from work. Proclamation was generally made by the herald, by command of the *Rex Sacrorum*, or *Flamines*, that all ſhould abſtain from buſineſs; and whoever tranſgreſſed the order was ſeverely fined.—The feriæ were of two kinds, public and private.

The *public* Feriæ were fourfold. 1. *Stativæ*, which were kept as public feaſts by the whole city upon certain immoveable days appointed in their kalendar;—ſuch were the *Compitalia*, *Carmentalia*, *Lupercalia*, &c. 2. *Feriæ Conceptivæ*, which were moveable feaſts, the days for the celebration of which were fixed by the magiſtrates or prieſts; of this ſort were the *Feriæ Latinæ*, *Paganalia*, *Compitalia*, &c. which happened every year, but the days for keeping them were left to the diſcretion of the magiſtrates or prieſts. 3. *Feriæ Imperativæ*, which were fixed and inſtituted by the mere command of conſuls, prætors, dictators, upon the gaining of ſome victory or other fortunate event. 4. *Nundinæ*. See the articles NUNDINÆ, AGONALIA, CARMENTALIA, &c.

The *private* Feriæ were holidays obſerved by particular perſons or families on ſeveral accounts, as birth-days, funerals, &c. The feriæ belonged to, and were one diviſion of, the *dies feſti*. See FESTI.

Feriæ ll Fermanaugh.

Feriæ Latinæ, a feſtival at which a white bull was ſacrificed, and the Latin and Roman towns provided each a ſet quantity of meat, wine, and fruits; and during the celebration, the Romans and Latins ſwore eternal friendſhip to each other, taking home a piece of the victim to every town. The feſtival was inſtituted by Tarquinius Superbus when he overcame the Tuſcans and made a league with the Latins, propoſing to build a common temple to Jupiter Latialis, at which both nations might meet and offer ſacrifices for their common ſafety. At firſt the ſolemnity laſted but one day, but it was at different times extended to ten. It was held on the Alban mount, and celebrated with chariot races at the capitol, where the victor was treated with a large draught of wormwood drink.

FERIA, in the Romiſh breviary, is applied to the ſeveral days of the week; thus Monday is the *feria ſecunda*, Tueſday the *feria tertia*; though theſe days are not working days, but holidays. The occaſion of this was, that the firſt Chriſtians were uſed to keep the eaſter-week holy, calling Sunday the *prima feria*, &c. whence the term *feria* was given to the days of every week. But beſides theſe, they have extraordinary feriæ, viz. the three laſt days of paſſion-week, the two following eaſter-day, and the ſecond feriæ of rogation.

FERIANA, the ancient city of Thala in Africa, taken and deſtroyed by Metellus in the war with Jugurtha. It was viſited by Mr Bruce in his late travels through Africa, who expected to have found many magnificent ruins in the place, but was diſappointed. The only remarkable objects he met with were the baths, which are exceſſively warm. Theſe are without the town, and flow from a fountain named *El Tarmid*. Notwithſtanding the exceſſive heat of its water, the fountain is not deſtitute of fiſhes. They are of the ſhape of a gudgeon, above four inches in length; and he ſuppoſed that there might have been about five or ſix dozen of them in the pool. On trying the water with a thermometer, he found the heat ſo great, that he was ſurpriſed the fiſh were not boiled in it. That fiſh ſhould exiſt in this degree of heat, is very ſurpriſing; but it ſeems no leſs wonderful that Mr Bruce, while ſtanding naked in ſuch water, ſhould leiſurely make obſervations on its heat, without ſuſpecting that he himſelf would be boiled by continuing there. We have to regret that the accidental wetting of the leaf on which he wrote down his remarks has deprived the public of the knowledge of the preciſe degree to which the thermometer is raiſed by this water. The fiſh are ſaid to go down the ſtream to ſome diſtance during the day, and to return to the ſpring or warmeſt part at night.

FERMANAUGH, a county of Ireland, in the province of Ulſter; bounded by Cavan on the ſouth, Tir-Oen on the north and north-eaſt, by Tyrconnel on the north-weſt, Leitrim on the ſouth-weſt, and Monaghan on the weſt. It is 38 miles long and 24 broad. A great part of it is taken up with bogs; and the great lake called *Lough-Earne*, which is near 20 miles in length, and in ſome places 14 in breadth, diverſified with upwards of 300 iſlands, moſt of them well wood-

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Ferment, Fermentation.

ed, inhabited, and covered with cattle. It abounds alſo with great variety of fiſh, ſuch as huge pike, large bream, roach, eels, trout, and ſalmon. The water of the lake in ſome places is ſaid to have a particular ſoftneſs and ſlimineſs, that bleaches linen much ſooner than could be done by other water. The lake is divided into the Upper and Lower, between which it contracts itſelf for five or ſix miles to the breadth of an ordinary river. In one part of the county are marble rocks 50 or 60 feet high. This county ſends four members to parliament, viz. two for the ſhire, and two for Inniſkillen the capital. Fermanaugh gives the title of viſcount to earl Verney.

FERMENT, any body which being applied to another, produces fermentation.

Ferments are either matters already in the act of fermentation, or that ſoon run into this act. Of the firſt kind are the flowers of wine, yeaſt, fermenting beer, or fermenting wine, &c. and of the ſecond are the new expreſſed vegetable juices of ſummer fruit.

Among diſtillers, ferments are all thoſe bodies which, when added to the liquor, only correct ſome fault therein, and, by removing ſome obſtacle to fermentation, forward it by ſecondary means: as alſo ſuch as, being added in time of fermentation, make the liquor yield a larger proportion of ſpirit, and give it a finer flavour.

FERMENTATION, may be defined a ſenſible internal motion of the conſtituent particles of a moiſt, fluid, mixed or compound body; by the continuance of which motion, theſe particles are gradually removed from their former ſituation or combination, and again, after ſome viſible ſeparation is made, joined together in a different order and arrangement, ſo that a new compound is formed, having qualities very ſenſibly different from thoſe of the original fluid.

1 Subjects of fermentation.

Fermentation, properly ſo called, is confined to the vegetable and animal kingdoms; for the effervеſcences between acids and alkalies, however much they may reſemble the fermentation of vinous liquors, are nevertheleſs exceedingly different. It is divided into three kinds; or rather, there are three different ſtages of it, viz. the vinous, the acetous, and the putrefactive. Of the firſt, vegetables alone are ſuſceptible; the fleſh of young animals is in ſome ſlight degree ſuſceptible of the ſecond (A); but animal ſubſtances are particularly ſuſceptible of the third, which vegetables do not ſo eaſily fall into without previouſly undergoing the firſt and ſecond. The produce of the firſt ſtage is wine, or ſome other vinous liquor; of the ſecond, vinegar; and of the third, volatile alkali. See BREWING, VINEGAR, &c.

Fermentation is one of the moſt obſcure proceſſes in nature, and no attempt has been made to ſolve it with any degree of probability. All that we know with regard to it is, that the liquor, however clear and tranſparent at firſt, no ſooner begins to ferment, than it becomes turbid, depoſits a ſediment, emits a great quantity of fixed air, and throws up a ſcum to the top, acquiring at the ſame time ſome degree of heat. The heat of the vinous ſtage, however, is but moderate, ſeldom or never exceeding that of the human body. The heat of the acetous is conſiderably greater; and that of the putrefactive is the greateſt of all, inſomuch that putrefying ſubſtances, when heaped together in great quantities, will ſometimes break forth into actual flame. Fermentation.

2 Phenomena of it.

From theſe phenomena, fermentation would ſeem to be a proceſs ultimately tending to the entire diſſolution of the fermenting ſubſtance, and depending upon the action of the internal heat, etherial fluid, or whatever elſe we pleaſe to call it, which pervades, and makes an eſſential ingredient in, the compoſition of all bodies. From ſuch experiments as have been made upon this ſubject, it appears, that whether fixed air is the bond of connection between the particles of terreſtrial bodies or not, yet the emiſſion of it from any ſubſtance is always attended with a diſſolution of that ſubſtance. We cannot, however, in the preſent caſe, ſay that the emiſſion of the fixed air is the *cauſe* of the fermentation. It is in fact otherwiſe. Fixed air hath no tendency to fly off from terreſtrial ſubſtances with which it is united; on the contrary, it will very readily leave the atmoſphere after it hath been united with it, to join itſelf to ſuch terreſtrial ſubſtances as are capable of abſorbing it. The emiſſion of it, therefore, muſt depend upon the action of ſome other fluid; moſt probably the fire or heat, which is diſperſed thro' all ſubſtances in a latent ſtate, and in the preſent caſe begins ſenſibly to manifeſt itſelf. But from what cauſe the heat originally begins to operate in this manner, ſeems to be entirely unknown and inexplicable, except that it appears ſome how or other to depend on the air; for, if that is totally excluded, fermentation will not go on. 3 Attempt to explain the phenomena.

In the Memoirs of the Mancheſter Society, Mr Henry gives an account of ſome experiments, in which he produced fermentation not only in bread and wort, but in liquors which we ſhould think quite incapable of it, viz. punch and whey. Having previouſly ſuſpected, from ſome obſervations and experiments, that yeaſt was only a quantity of fixed air involved and detained among the mucilaginous parts of the fermenting liquor, he attempted to prepare it in the following manner. Having boiled wheat-flour and water to the conſiſtence of a thin jelly, he put this viſcous fluid into the middle part of Dr Nooth's machine for impregnating water with fixed air. The gas was abſorbed in conſiderable quantity; and next day the matter was in a ſtate of fermentation. The third day it had acquired ſo much of the appearance of yeaſt, that an experiment was made on ſome paſte for bread; and after five or ſix hours baking, it 4 Mr Henry's experiments on producing fermentation by impregnating the liquor with fixed air.

(A) Under the article CHINA, n° 114. a fact is mentioned which ſeems to ſhow that animal ſubſtances are likewiſe capable of the vinous fermentation; viz. that the Chineſe make uſe of a certain liquor called *lamb-wine*, and likewiſe that they uſe a kind of ſpirit diſtilled from *ſheep's fleſh*. This is related on the credit of M. Grofier: but as he does not mention the particulars of the proceſs, we are at liberty to ſuppoſe that the fleſh of theſe animals has been mixed with rice, or ſome other ingredients naturally capable of producing a vinous liquor; ſo that, inſtead of contributing any thing to the fermentation in queſtion, they may in reality be detrimental, and furniſh only that ſtrong and diſagreeable ſmell complained of in the liquid.

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Fermentation.

it was found to have anſwered the purpoſe tolerably well. Another experiment was made with wort; but here the artificial yeaſt was not made uſe of. Inſtead of this, part of the wort itſelf was put into Nooth's machine, and impregnated with fixed air, of which it imbibed a large quantity. On being poured into the remainder of the liquor, a briſk fermentation came on in 24 hours, "a ſtrong head of yeaſt began to collect on its ſurface, and on the third day it ſeemed fit for tunning." In proſecuting the experiment, good bread was made with the yeaſt taken off from the ſurface; and beer was produced by keeping the fermented liquor, and good ardent ſpirit produced by diſtilling it. In another experiment, in which a fourth part of the wort was impregnated but not ſaturated with fixed air, the fermentation did not commence ſo ſoon, though it is probable that it would alſo have taken place at laſt without any farther addition. The experiment commenced about midnight; but in the morning there were no ſigns of fermentation. At five in the afternoon there was only a ſlight *mantling* on the ſurface. A bottle with a perforated ſtopper and valve containing an effervеſcing mixture of chalk and vitriolic acid was then let down to the bottom of the veſſel; the diſcharge of air from this mixture was going on rapidly at nine o'clock; while the liquor at the ſame time ſeemed to be in a ſtate of effervеſcence. At 11 o'clock the bottle was withdrawn, as the fermentation was commenced beyond a doubt, the liquor having a pretty ſtrong head of yeaſt upon it. Next day the fermentation ſeemed to be on the decline, but was recovered by a ſecond immerſion of the mixture. When the vinous fermentation was finiſhed, the liquor, by being kept too long, was found converted into vinegar; ſo that in the courſe of theſe experiments, ale, bread, yeaſt, ardent ſpirit, and vinegar, had all been produced.

5 Remarks on them.

From theſe experiments it would ſeem natural to ſuppoſe that fixed air was the *cauſe* of fermentation, contrary to what has been already laid down. But in fact there is not any contradiction here to the poſition juſt mentioned; for the quantity of fixed air introduced into the liquor on Mr Henry's experiments was too great for it to contain. Some part of the latent heat by which the elaſticity of that fluid is produced may likewiſe have been abſorbed, and diſpoſed the liquor to run into the fermenting ſtate ſooner than it would otherwiſe have done. Or, perhaps, when any fluid ſubſtance of the aqueous kind contains an extraordinary proportion of fixed air, it may be thus inclined to run into the fermentative proceſs, by ſome diſpoſition of the air itſelf to reaſſume its elaſtic ſtate. This ſeems probable from Mr Henry's experiments with Pyrmont water. Having made ſome punch with an artificial water of this kind, he put a pint of it into a quart bottle and ſtopped it with a cork. On opening it three or four days after, he found that it creamed and mantled like the briſkeſt bottled cyder; ſo that it was taken for ſome delicious liquor hitherto unknown. This length of time he found was neceſſary to give the briſkneſs juſt mentioned to the fluid; for artificial Pyrmont water itſelf aſſumes a briſk and ſparkling appearance after being kept three or four days, though it has it not at firſt, unleſs a very great quantity of air be forced into it at its preparation. In like manner a quantity of whey, impregnated with fixed air, was changed into a briſk and ſparkling vinous liquor by keeping for ſome time in a bottle looſely corked.

On certain ſubſtances, however, both fluid and ſolid, fixed air hath a different effect. Thus, when mixed with alkaline ſalts, whether fixed or volatile, fluid or ſolid, it firſt neutraliſes, and then renders them acid, without the leaſt tendency to fermentation, unleſs an acid be added. Then indeed a great effervеſcence will enſue; but this, as we have already ſaid, is not a true fermentation. On calcareous earths its effect is ſomewhat ſingular: for theſe earths, when pure, are ſoluble in water; when joined with a certain proportion of fixed air, they become inſoluble; and with an over-proportion they become ſoluble again; but none of them ſhow any diſpoſition to fermentation, though kept ever ſo long in either ſtate. As water therefore contains a great quantity of latent heat which it readily parts with, the probability ſtill is, that a diſpoſition to unite with the ſolid part of fixed air exiſts in that element, rather than to remain combined with the water. It is likewiſe well known that all fermentable ſubſtances, ſuch as the juices of ripe fruits, ſugar, &c. contain much fixed air, and therefore fall ſpontaneouſly into fermentation when kept in a gentle warmth. This laſt circumſtance ſupplies a quantity of ſenſible heat, or elementary fire acting in its expanſive form, which the water more readily parts with than that which acts upon its own particles in ſuch a manner as to keep them eaſily moveable upon one another, and thus occaſion its fluidity. Other ſubſtances contain leſs fixed air, as infuſion of malt, potatoes, turnips, &c. whence it is neceſſary to add an extraordinary quantity to them, either inveloped in mucilaginous matter which is analogous to yeaſt, or pure as was done by Mr Henry.

Thus we may ſuppoſe fermentation to conſiſt in the action of elementary fire expanding the fixed air naturally contained in the fluid, or artificially introduced into it; in conſequence of which certain changes are produced in the nature of the fluid itſelf; and it becomes a vinous, acetous, or putrid liquor, according to the degree of action which takes place.

6 Dr Peaington's opinion.

This ſeems to coincide with the opinion of Dr Penington of Philadelphia, who, in his inaugural diſſertation on this ſubject, makes a change of the ſenſible qualities of the ſubſtance the only criterion of fermentation. Hence he denies that any true fermentation exiſts in the raiſing of bread, as is commonly ſuppoſed; and indeed his arguments on this ſubject ſeem deciſive.

7 His experiments on the fermentation of bread.

To aſcertain this, he put into a retort ſome dough which had been raiſed in three quarters of an hour; and, on applying a gentle heat, ſome aqueous liquid came over, which did not ſhow the leaſt veſtige of vinous ſpirit, though the remainder of the ſame dough afforded a good and well fermented bread. On adding a little water to the dough which remained in the retort, and letting the mixture ſtand in a gentle warmth for nine hours, no ſign of fermentation appeared; but in 16 hours the proceſs ſeemed to have been going on for ſome time; and on diſtillation yielded a ſmall quantity of vinous ſpirit. Hence it appears that flour requires more than nine hours before it ferments; but as bread frequently riſes in one hour, the proceſſes muſt ſome how or other be eſſentially different. "From a variety of facts (ſays our author),

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thor), I am induced to give the following explanation of the process (making of bread). Yeaſt is a fluid containing a large quantity of fixed air or aerial acid; and the proportion is greater as the fluid is colder. As ſoon as the yeaſt is mixed with the dough, heat is applied; this extricates the air in an elaſtic ſtate; and as it is now diffuſed through every particle of dough, every particle muſt be raiſed; the viſcidity of the maſs retains it: it is now baked, and a ſtill greater quantity of air is extricated by the increaſed heat; and as the cruſt forms, the air is prevented from eſcaping; the water is diſſipated: the loaf is rendered ſomewhat dry and ſolid; and between every particle of bread we find a particle of air, as appears from the ſpongy appearance of the bread, owing to the apparent vacancies which the air had made by inſinuating itſelf into it." This explanation he finds alſo confirmed by what is called the *falling* of bread after it has once been raiſed; and which takes place ſo rapidly, that we cannot ſuppoſe the proceſs of fermentation to have been finiſhed in the time: nay, bread will fall before we are warranted from his experiment to ſay that the fermentation is well begun; for this, as we have ſeen, required between 9 and 16 hours.

8 His explanation of the proceſs.

That bread is raiſed, not by a proper fermentation, but by a mere efferveſcence or eſcape of fixed air, is likewiſe evident from ſeveral facts mentioned by Dr Penington. In Philadelphia, the bakers find ſome difficulty in getting good yeaſt in the ſummer-time, on account of the heat of the weather, which very ſoon turns it ſour. In this caſe, they diſſolve a ſmall quantity of potaſh in water, and mix it with their yeaſt; when the efferveſcence produced between the acid and alkali produces ſuch a diſcharge of fixed air, as raiſes the bread in leſs than ten minutes. He informs us alſo, on the authority of Dr Ruſh late profeſſor in the college of Philadelphia, that "near Saratoga there are two mineral ſprings, the waters of which have all the properties of the famous Pyrmont water, being highly impregnated with fixed air. When this water is mixed with flour into dough, it is ſufficient, without yeaſt, to make a very light and palatable bread." A third fact is ſtill more deciſive. "I procured (ſays the Doctor) ſome nice cryſtals of the ſalt formed by the foſſile alkali and fixed air, and diſſolved them in water ſufficient to make a ſmall loaf of bread. To this I added a little of the marine acid, commonly called ſpirit of ſea-ſalt; fixed air was generated, but was abſorbed by the cold-water; it was then mixed with flour, ſet in a warm place to riſe, and ſhortly after baked; and I had the exquiſite pleaſure to obtain a tolerably light loaf of bread, ſuch as any one would have ſuppoſed to have been fermented, which was ſeaſoned by the ſea-ſalt, formed by the union of the foſſile alkali and ſpirit of ſea-ſalt; whilſt the fixed air of the foſſile alkali was diſengaged, in order to raiſe it."

9 Other facts in confirmation of his opinion.

To theſe inſtances mentioned by our author we ſhall add two others, which ſhow that fixed air is not even neceſſary to the raiſing of bread; and of conſequence we cannot ſuppoſe that fermentation, which produces a great quantity of it, is the foundation of the proceſs. One is, that eggs, when beaten into a froth, are ſometimes made uſe of for raiſing bread; but more eſpecially for puddings, &c. in which they perform an operation ſimilar to that of raiſing and rendering bread light and ſpongy. This is done by the rarefaction of the particles of air enveloped among the glutinous particles of the egg: and hence ſnow, on acccount of its porous and ſpongy nature, containing a great quantity of air enveloped amongſt its particles, will do the ſame thing. This laſt particular was lately publiſhed by Dr Rotheram of Newcaſtle.

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10 His obſervations on Mr Henry's experiments.

With regard to the other experiments of Mr Henry, they ſeem to Dr Penington not to be altogether concluſive. He doubts the juſtice of Mr Henry's idea, "that *wort* cannot be brought into the vinous fermentation without the addition of a ferment." When we conſider the analogy betwixt the infuſion of malt and other fermentable liquids, the Doctor ſuppoſes that wort, as well as they, might ſpontaneouſly fall into a ſtate of fermentation. He ſays indeed, that he has not as yet been able to diſprove the idea by experiment: but Captain Cook has already made the experiment, and the event has decided the matter in the Doctor's favour*. We are told by that celebrated navigator, that the inſpiſſated wort would have anſwered the purpoſe excellently, provided it could have been kept from fermentation in its inſpiſſated ſtate. But this was found impoſſible: of conſequence we muſt conclude, that wort, as well as other liquors, will fall into a ſtate of fermentation ſpontaneouſly, though perhaps not ſo readily, or with ſuch a ſmall degree of heat, as other fermentable liquors. Hence we are not altogether certain, as Dr Penington hints, whether the fermentation in Mr Henry's experiments might not have taken place without it. "In the memoir (Mr Henry's) above mentioned, ſays the Doctor, the author ſeems to think, that *fixed air* is the true cauſe of fermentation in vinous liquors; and he tells us of the excellent taſte afforded to punch by being impregnated with it. Fixed air, it is well known, improves the *taſte* of liquors; but we cannot ſuſpect that it made the punch ferment in his experiment: but he tells us, that he made an artificial yeaſt; that with this yeaſt he made beer (perhaps he might have made it without it) and vinegar; and that he fermented bread with it. As for its fermenting bread, we might readily allow that it would raiſe bread, upon the principles already laid down: and when he tells us how quick the fermentation takes place in his liquors when expoſed to a gentle heat, may we not juſtly ſuppoſe, that the warmth extricated the fixed air that he had artificially combined with it, and that from this phenomenon alone he had ſuppoſed fermentation to be going on in them? Fixed air is the cauſe of the briſkneſs, pungent taſte, and ſparkling appearance, of vinous liquors; and it is remarkable, that, in equal circumſtances, the colder they are, the more air they contain. It is alſo a curious fact, that the fixed air in liquors muſt be in a peculiar ſtate, otherwiſe they do not poſſeſs that briſkneſs or pungency we ſpoke of; in fact, it muſt be on the point of aſſuming its elaſtic form: hence liquors are not ſo briſk in cold as in warm weather; and a connoiſſeur in porter, for inſtance, will tell you, that a bottle ſhall open very briſkly in a warm day; and upon the coming on of cold weather, all the reſt ſhall be flat and dead; but let them be corked up and kept in a warm room for a few days, they will all recover their former briſkneſs; nay, I

* See the article *Cook*, vol. v. p. 394. col. 2.

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Fermentation. have seen a bottle opened in a cold day, that has been quite vapid, which was made brisk and lively by corking it up tight again, and setting it for ten or twelve minutes in a bason of water a little more than milk warm."

11 His theory of fermentation. Our author's theory of fermentation is to the following purpose. 1. The heat occurring in the mixture, he explains on Dr Black's principle of latent heat. 2. In the fermenting process, he supposes the inflammable part of the mixture to have a tendency to combine with pure air, and thus to form what is called *fixed air*. 3. The pure air is supposed to be derived from the atmosphere, while inflammable air is furnished by the fermenting liquor. 4. The fixed air found in such plenty above the liquid while in a state of fermentation, does not exist in it originally, but is formed by a combination of the two ingredients just mentioned. 5. On these principles the heat which takes place in the mixture may be particularly explained in the following manner. "Suppose that the quantity of heat in the two airs before combination was in each as *ten*; or, in other words, that they were capable of containing that quantity in a latent state essential to their existence as matter in that form; when they unite, they form a very different kind of air, which is not capable of combining with so much heat, and perhaps quite foreign to its existence as that kind of matter: we will suppose then, that it can combine with but a quantity of that heat as *five*; the consequence must then be, that there is a quantity of redundant heat, as *fifteen*; and there being no bodies at hand undergoing any changes in their properties, by which their capacities to unite with heat as a principle are increased, it becomes *mechanically diffused* among those bodies which are nearest to it; it gives the redundant heat to the hand," &c.

12 General remark. We shall conclude this article with one obvious remark, viz. that the dispute concerning Mr Henry's method of inducing fermentation, may be easily decided by a comparative trial. Let, for instance, two gallons of wort, the quantity he used in his experiment, be put into a certain vessel without addition, and kept in a moderate heat for a certain time; take other two gallons, and impregnate the whole or any part of it with fixed air, according to Mr Henry's method: put the whole then into a vessel similar to the other, and set it in the same place; and if the fermentation begins in the one impregnated with fixed air sooner than the other, we have good reason to believe that the fixed air was the cause of its doing so. This experiment is easily made, and must be of considerable importance to the public: for, as Mr Henry justly observes, his experiments "may be of extensive utility, and contribute to the accommodation, the pleasure, and the health, of men in various situations, who have hitherto been precluded in a great measure from the use of fermented liquors; and be the means of furnishing important articles of diet and of medicine." Even as matters stand, we must consider this end as accomplished; though, if the mere circumstance of heat, without fixed air, would bring on fermentation, it would undoubtedly render the process considerably easier, by saving the trouble of impregnating the liquor with fixed air. With regard to bread, his method seems to be entirely decisive.

The business of fermentation is one of the great preparations to the distillery. What we usually call vinous fermentation in particular, is the kind in which it is principally concerned. By this we usually understand that physical action, or intestine commotion of the parts of a vegetable juice, tincture, or solution, which render them fit to yield an inflammable spirit on distillation. Fermentation.

This fermentation in the hands of the distiller differs from the common one that is used in the making of potable vinous liquors, as being much more violent, tumultuary, active, and combinatory than that. A large quantity of yeast, or other ferment, is added to the distiller's fermentation; the free air is admitted, and every thing is contrived to quicken the operation, so that it is sometimes finished in two or three days. This great dispatch, however necessary to the large dealer, has its inconveniences attending it; for the spirit is by this means always fouler, more gross, and really terrestrial, than it would have been if the liquor had undergone a proper fermentation in a slower manner. It also suffers a diminution in its quantity, from the violent and tumultuary admission, conflict, and agitation of the free air, both in the body and upon the surface of the liquor, especially if the liquor be not immediately committed to the still as soon as the fermentation is fairly slacked or fully ended. It is a very difficult task to render the business of fermentation at once perfect and advantageous. To ferment, in perfection, necessarily requires length of time and careful attendance, and close vessels, beside several other articles of nice management, which cannot be expected to be received and practised in the large way, on account of the trouble and expence, unless it could be proved to the distillers, as possibly it sometime may, that the quantity of spirit would be so much greater from the same quantity of materials managed thus, than by the common way, that it will more than pay its own expence: to which may be added, the very well known advantage of the spirit thus procured by perfect fermentation, being much finer than that obtained in the common way. Till this shall be made out, it may not be amiss to try how much of the more perfect art of vinous fermentation is profitably practicable by the distiller in the present circumstances of things. The improvements to be made in this affair will principally regard, 1. The preparation or previous disposition of the fermentable liquor. 2. The additions tending to the general or some particular end. 3. The admission or exclusion of the air. 4. The regulation of the external heat or cold. And, 5. A suitable degree of rest at last. When proper regard is had to these particulars, the liquor will have its due course of fermentation, and it will thence become fit to yield a pure and copious inflammable spirit by distillation. The tincture, solution, or liquor, intended for fermentation, for the still, should be considerably thin and aqueous. That sort of richness there is in the twelve-shilling small beer, is the utmost that ought to be allowed to it. This property not only fits it to ferment readily, but also to yield a larger quantity in proportion of a pure vinous spirit, than it would do if it were more rich or clammy: the gross, foul, viscid, and earthy particles of such glutinous liquors, being after fermentation apt to rise up with the boiling heat which

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which muſt neceſſarily be employed to raiſe the ſpirit; and the ſpirit thus of courſe comes over foul and fetid. There is alſo another advantage attending the thinneſs of this liquor, which is, that it will ſooner become fine by ſtanding before fermentation; whence it may be commodiouſly drawn off from its feces or bottom, which muſt always, in caſe of corn, malt, or any other mealy ſubſtance, be kept out where the purity of the ſpirit is conſulted. A certain degree of warmth ſeems neceſſary in all the northern climates, to all ſorts of artificial liquors intended for immediate fermentation, eſpecially in winter; but the natural juices of vegetables, which have never been inſpiſſated, as that of grapes and other fruits when fully ripened, will uſually ferment, as ſoon as they are expreſſed, without any external aſſiſtance. But as a certain degree of inſpiſſation prevents all tendency to fermentation in all vegetable juices, though otherwiſe ſtrongly diſpoſed to ferment; ſo a long continuance, or an increaſe of the inſpiſſating heat, eſpecially if it acts immediately thro' a metalline or ſolid body upon the juice, will deſtroy its fermenting property; and it will do this the more effectually, as the heat employed approaches to that of ſcorching, or the degree capable of giving an empyreuma.—After the ſame manner, ſeveral experiments make it appear that there is a certain degree of heat, the continuance or leaſt increaſe of which proves detrimental or deſtructive to fermentation, as there is another which in a wonderful manner encourages and promotes it. Theſe two degrees of heat ought to be carefully noted and ſettled by the thermometer, or other certain methods, for philoſophical and chemical uſes; but for common, or all economical occaſions, they may be limited to what we call a tepid and fervid heat. A fervid heat is the bane of all vinous fermentation; as a tepid one, or rather imperceptible warmth, is the great promoter of them. In this neutral ſtate, therefore, with proper contrivances to preſerve and continue it, the liquor is to be put into a ſuitable veſſel for fermentation; at which time, if it works not of itſelf, it muſt be quickened by additions; and, in general, by ſuch things as are commonly called *ferments*.

The juices of plants are ſtrangely altered by fermentation; and are ſuſceptible of many, and thoſe very various, changes from it. And it is not only the juices of fruits that are thus to be wrought upon, as thoſe of apples, pears, grapes, and the like, in the common way; but there is an artificial change to be made in the ſeeds of plants by what is called *malting*. And it is not grain alone that is thus to be wrought upon, but any other ſeed whatever may be made to yield its juices and virtues freely to water by this proceſs. The juices of roots alſo, for inſtance that of liquorice, will be wrought upon in the ſame manner; and the juices of the bodies of trees, as of the birch, and the like. If in the month of March a hole be bored into the body of a birch-tree, and this hole be ſtopped with a cork, through the middle of which there is thruſt a quill open at both ends, the juices of the tree will drop out at the quill at the rate of a large drop every ſecond of a minute, and a great quantity will in time be obtained in this manner. This liquor is not unpleaſant to the taſte, and looks tolerably clear, reſembling water into which a little milk had been ſpilt. There are many ways of fermenting this juice, by all of which it is converted into a ſort of wine. Theſe are well known. But there is another remarkable property in our maples, both the common ſmall kind and the great one, which we call the ſycamore: theſe being tapped in the ſame manner, will bleed freely in winter; and their juices, after a hard froſt breaks, will flow out in ſo copious a manner as is ſcarce to be conceived. The willow, the poplar, and the walnut-tree, will all bleed alſo; and fermentation, of which their ſeveral juices are eaſily ſuſceptible, will turn them all into palatable and ſtrong wines.

Fern || Fernelius.

FERN, FILIX, in botany. See FILICES.

Fern is very common in dry and barren places. It is one of the worſt weeds for lands, and very hard to deſtroy where it has any thing of a deep ſoil to root in. In ſome grounds, the roots of it are found to the depth of eight feet. One of the moſt effectual ways to deſtroy it is often mowing the graſs; and, if the field is ploughed up, plentiful dunging thereof is very good: but the moſt certain remedy for it is urine. However, fern, cut while the ſap is in it, and left to rot upon the ground, is a very great improver of land.

In ſome places of the north, the inhabitants mow it green; and, burning it to aſhes, make thoſe aſhes up into balls with a little water. They then dry them in the ſun, and make uſe of them to clean their linen with; looking upon it to be near as good as ſoap for that purpoſe.

Male FERN. See POLYPODIUM.

Female FERN. See PTERIS.

FERNANDO, or FERNANDES, an iſland in the Pacific ocean. See *JUAN Fernandes*.

FERNELIUS (John), phyſician to Henry II. king of France, was born in Picardy, in the latter end of the 15th or the beginning of the 16th century. Being ſent to Paris to ſtudy rhetoric and philoſophy, he applied himſelf in a moſt intenſe manner. All other pleaſure was inſipid to him. He cared neither for play nor for walking, nor for entertainments, nor even for converſation. He read Cicero, Plato, and Ariſtotle. The reading of Cicero procured him this advantage, that the lectures he read on philoſophical ſubjects were as eloquent as thoſe of the other maſters were barbarous at that time. He alſo applied himſelf very earneſtly to the mathematics. This continual ſtudy drew upon him a long fit of ſickneſs, which obliged him to leave Paris. On his recovery, he returned thither with a deſign to ſtudy phyſic; but before he applied himſelf entirely to it, he taught philoſophy in the college of St Barbara. After this he ſpent four years in the ſtudy of phyſic; and taking a doctor's degree, confined himſelf to his cloſet, in order to read the beſt authors, and to improve himſelf in the mathematics; that is, as far as the buſineſs of his profeſſion would ſuffer him. Never was a man more diligent than Fernel. He uſed to riſe at four o'clock in the morning, and ſtudied till it was time either to read lectures or to viſit patients. He then examined the urine that was brought him; for this was the method of thoſe times, with regard to the poor people, who did not ſend for the phyſician. Coming home to dine, he ſhut himſelf up among his books till they called him down to table. Riſing from table, he returned to his ſtudy, which he did not leave without neceſſary occaſions. Coming home at night, he did juſt as at noon: he ſtaid among his books till they called him to ſupper; returned

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Fernelius ‖ Ferrara.

turned to them the moment he had ſupped; and did not leave them till eleven o'clock, when he went to bed. In the courſe of theſe ſtudies, he contrived mathematical inſtruments, and was at great charges in making them. But his wife murmuring at the expence, he diſmiſſed his inſtrument-makers, and applied himſelf in good earneſt to practiſe phyſic. But as viſiting patients did not employ his whole time, he read public lectures upon Hippocrates and Galen. This ſoon gained him a great reputation through France and in foreign countries. His buſineſs increaſing, he left off reading lectures; but as nothing could make him ceaſe to ſtudy in private, he ſpent all the hours he could ſpare in compoſing a work of phyſic, intitled *Phyſiologia*, which was ſoon after publiſhed. He was prevailed with to read lectures upon this new work, which he did for three years: and undertaking another work, which he publiſhed, *De venæ ſectione*, he laid himſelf under a neceſſity of reading lectures ſome years longer, in order to explain this new book to the youth. While he was thus employed, he was ſent for to court, in order to try whether he could cure a lady, whoſe recovery was deſpaired of. He was ſo happy as to cure her; which was the firſt cauſe of that eſteem which Henry II. who was then but dauphin, and was in love with that lady, conceived for him. This prince offered him, even then, the place of firſt phyſician to him; but Fernel, who infinitely preferred his ſtudies to the hurry of a court, would not accept the employment. When Henry came to the throne, he renewed his intreaties: but Fernel repreſented, that the honour which was offered to him was due, for ſeveral reaſons, and as an hereditary right, to the late king's phyſician; and that, as for himſelf, he wanted ſome time to make experiments concerning ſeveral diſcoveries he had made relating to phyſic. The king admitted this: but as ſoon as Francis I.'s phyſician died, Fernel was obliged to go and fill his place at Henry II.'s court. And here juſt the contrary to what he dreaded came to paſs; for he enjoyed more reſt and more leiſure at court than he had done at Paris; and he might have conſidered the court as an agreeable retirement, had it not been for the journeys which the new civil war obliged the king to take. He died in 1558, leaving behind him a great many works, beſides what have been mentioned; as, *De abditis rerum cauſis*, ſeven books of Pathology, a book on Remedies, &c. They have been printed ſeveral times; with his life prefixed, written by William Plantius his diſciple.

FERONIA, the pagan goddeſs of woods and orchards. This deity took her name from the town Feronia, ſituated at the foot of mount Soracte in Italy, where was a wood and temple conſecrated to her. That town and wood are mentioned by Virgil, in the catalogue of Turnus's forces. Strabo relates, that thoſe who ſacrificed to this goddeſs, walked barefoot upon burning coals, without being hurt. She was the guardian deity of freed-men, who received their cap of liberty in her temple.

FERRARA, a city of Italy, in the territory of the pope, capital of a duchy of the ſame name. It is ſeated in an agreeable and fertile plain; watered by the river Po, which is a defence on one ſide; and on the other is encompaſſed by a ſtrong wall and deep broad ditches full of water, as well as by a good citadel, finiſhed by pope Paul. In the middle of the city is a magnificent caſtle, which was formerly the palace of the dukes, and is not now the leaſt ornament of Ferrara. It is quite ſurrounded with water; and the arſenal, which is near it, deſerves the obſervation of travellers. Over-againſt the palace is the duke's garden; with a park, called *Belvidere* on account of its beauty. Behind the garden there is a palace, built with white marble, called the *palace of diamonds*, becauſe all the ſtones are cut diamond faſhion.

Ferrara ‖ Ferrara.

Ferrara had formerly a conſiderable trade; but it is now almoſt deſerted, being very poor, inſomuch that there is hardly a perſon to be ſeen in the ſtreets. This is owing to the exactions of the popes. The fortifications are now neglected, and the ancient univerſity is dwindled into a wretched college of the Jeſuits. However, in 1735, it was advanced to an archbiſhopric by pope Clement XII. The country about it is ſo marſhy, that a ſhower or two of rain renders the roads almoſt impaſſable. It is 24 miles north-eaſt of Bologna, 38 north-weſt of Ravenna, 70 north-by-weſt of Florence, and 190 north of Rome. E. Long. 12. 14. N. Lat. 44. 36.

FERRARA, the duchy of; a province in the pope's territory, bounded on the north by the ſtate of Venice, on the weſt by the duchies of Mantua and Mirandola, on the ſouth by the Boulogneſe and by Romania, of which it was formerly a part, and on the eaſt by the Gulph of Venice. It is 50 miles in length, and 43 in breadth along the coaſt; but grows narrower and narrower towards the Mantuan. This country is almoſt ſurrounded by the branches of the Po, which often overflow the country, and form the great moraſs of Comachio, which has a bad effect on the air. It is thin of people, and indifferently cultivated, though fit for corn, pulſe, and hemp. The Po and the lake of Comachio yield a large quantity of fiſh. Ferrara is the capital town; beſides which there are Arano, Comachio, Magnavacca, Belriguardo, Cento, Buendeno, and Ficherola. This duchy was formerly poſſeſſed by the houſe of Eſte. But the pope took poſſeſſion of it in 1598, after the death of Alphonſo II. duke of Ferrara, it being a fief of the church.

FERRARIA, in botany: A genus of the triandria order, belonging to the gynandria claſs of plants; and in the natural method ranking under the ſixth order, *Enſatæ*. The ſpathæ are uniflorous; the petals ſix in number, and wavingly curled; the ſtigmata cucullated or cowled; the capſule is trilocular, inferior. There are two ſpecies, natives of the Cape of Good Hope. There is a great ſingularity in the root of one of theſe ſpecies, that it vegetates only every other year, and ſometimes every third year; in the intermediate time it remains inactive, though very ſound and good.

FERRARS (George), a lawyer, poet, hiſtorian, and accompliſhed gentleman, was deſcended from an ancient family in Hertfordſhire, and born about the year 1510, in a village near St Alban's. He was educated at Oxford, and thence removed to Lincoln's inn; where applying with uncommon diligence to the ſtudy of the law, he was ſoon diſtinguiſhed for his elocution at the bar. Cromwell earl of Eſſex, the great miniſter of Henry VIII. introduced him to the king, who employed him as his menial ſervant, and, in 1535, gave him

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Ferrars Ferretto.

him a grant of the manor of Flamſtead in his native county. This is ſuppoſed to have been a profitable eſtate; nevertheleſs, Mr Ferrars being a gay courtier, and probably an expenſive man, about ſeven years after was taken to execution by a ſheriff's officer for a debt of 200 merks, and lodged in the compter. Being at this time member for Plymouth, the houſe of commons immediately interfered, and he ſoon obtained his liberty. He continued in favour with the king to the end of his reign, and in that of Edward VI. he attended the lord protector Somerſet as a commiſſioner of the army in his expedition to Scotland in 1548. In the ſame reign, the young king being then at Greenwich, Mr Ferrars was proclaimed *lord of miſrule*, that is, prince of ſports and paſtimes; which office he diſcharged during 12 days, in Chriſtmas holidays, to the entire ſatisfaction of the court. This is all we know of Mr Ferrars; except that he died in 1579, at Flamſtead in Hertfordſhire, and was buried in the pariſh-church. He is not leſs celebrated for his valour in the field, than for his other accompliſhments as a gentleman and a ſcholar. He wrote, 1. Hiſtory of the Reign of Queen Mary; publiſhed in Grafton's chronicle, 1569, fol. 2. Six tragedies, or dramatic poems; publiſhed in a book called the *Mirror for Magiſtrates*, firſt printed in 1559, afterwards in 1587, and again in 1610.

FERRARS (Henry), a Warwickſhire gentleman of a good family, was eminent in antiquities, genealogies, and heraldry. Mr Wood ſays, that out of the collections of this gentleman, Sir William Dugdale laid part of the foundation of his celebrated *Antiquities of Warwickſhire*. Cambden alſo makes honourable mention of his aſſiſtance in relation to Coventry. Some ſcattered poems of his were publiſhed among others in the reign of queen Elizabeth; and he died in 1633.

FERRET, in zoology. See MUSTELA.

FERRETS, among glaſs-makers, the iron with which the workmen try the melted metal, to ſee if it be fit to work.—It is alſo uſed for thoſe irons which make the rings at the mouth of the bottles.

FERRETTO, in glaſs making, a ſubſtance which ſerves to colour glaſs.

This is made by a ſimple calcination of copper, but it ſerves for ſeveral colours: there are two ways of making it. The firſt is this. Take thin plates of copper, and lay them on a layer of powdered brimſtone, in the bottom of a crucible; over theſe lay more brimſtone, and over that another layer of the plates, and ſo on alternately till the pot is full. Cover the pot, lute it well, place it in a wind-furnace, and make a ſtrong fire about it for two hours. When it is taken out and cooled, the copper will be found ſo calcined, that it may be crumbled to pieces between the fingers like a friable earth. It will be of a reddiſh, and, in ſome parts, of a blackiſh colour. This muſt be powdered and ſifted fine for uſe.

Another way of making ferretto is as follows. Make a number of ſtratifications of plates of copper and white vitriol alternately in a crucible; which place on the floor of the glaſs furnace near the eye; and let it ſtand there three days; then take it out, and make a new ſtratification with more freſh vitriol; calcine again as before. Repeat this operation ſix times, and a moſt valuable ferretto will be obtained.

Ferri, Ferro.

FERRI (Ciro), a ſkilful painter, born of a good family at Rome, in 1634. He was bred under Peter Cortona; and the works of the ſcholar are often miſtaken for thoſe of the maſter. The great duke of Tuſcany nominated him chief of the Florentine ſchool; and he was as good an architect as a painter. He died in 1689.

FERRO, (W. Long. 19. N. Lat. 28), the moſt weſterly of the Canary iſlands, near the African coaſt, where the firſt meridian was lately fixed in moſt maps; but now, the geographers of almoſt every kingdom make their reſpective capitals the firſt meridian, as we do London. It is a dry and barren ſpot, affording no water except what is ſupplied in a very ſurpriſing manner by a tree which grows in theſe iſlands. See FOUNTAIN-*Tree*.

FERRO, *Faro*, or *Feroe Iſlands*; a cluſter of little iſlands lying in the Northern ocean, between 61° and 63° N. Lat. and between 5° and 8° W. Long. They belong to Denmark. There are 17 which are habitable; each of which is a lofty mountain ariſing out of the waves, divided from the others by deep and rapid currents. Some of them are deeply indented with ſecure harbours; Providence ſeeming to have favoured mankind with the ſafeſt retreats in the moſt boiſterous ſeas. All are very ſteep, and moſt of them faced with moſt tremendous precipices. The ſurface of the mountains conſiſts of a ſhallow ſoil of remarkable fertility; for barley, the only corn ſown here, yields above 20 for one; and the graſs affords abundant paſturage for ſheep. The exports are, ſalted mutton and tallow, gooſe-quills, feathers, and eider-down; and, by the induſtry of the inhabitants, knit woollen waiſtcoats, caps, and ſtockings. No trees beyond the ſize of juniper or ſtunted willows will grow here; nor are any wild quadrupeds to be met with except rats and mice, originally eſcaped from the ſhipping. Vaſt quantities of ſea-fowl frequent the rocks; and the taking of them furniſhes a very perilous employment to the natives, as deſcribed under the article *Bird-Catching*.

The ſea which ſurrounds theſe iſlands is extremely turbulent. The tides vary greatly on the weſtern and eaſtern ſides. On the firſt, where is received the uninterrupted flood of the ocean from the remote Greenland, the tide riſes ſeven fathoms; on the eaſtern ſide it riſes only three. Dreadful whirlwinds, called by the Danes *oes*, agitate the ſea to a ſtrange degree; catch up a vaſt quantity of water, ſo as to leave a great temporary chaſm in the ſpot on which it falls, and carries away with it, to an amazing diſtance, any fiſhes which may happen to be within reach of its fury. Thus great ſhoals of herrings have been found on the higheſt mountains of Feroe. It is equally reſiſtleſs on land; tearing up trees, ſtones, and animals, and carrying them to very diſtant places.

Among the numerous whirlpools of theſe ſeas, that of Suderoe, near the iſland of the ſame name, is the moſt noted. It is occaſioned by a crater 61 fathoms in depth in the centre, and from 50 to 55 on the ſides. The water forms four fierce circumgirations. The point they begin at is on the ſide of a large baſon, where commences a range of rocks running ſpirally, and terminating at the verge of the crater. This range is extremely rugged, and covered with water from the depth of 12 to 8 fathoms only. It forms four equi-

diſtant

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Ferrol || Ferula.

distant wreaths, with a channel from 35 to 20 fathoms in depth between each. On the outside, beyond that depth, the sea suddenly sinks to 80 and 90. On the south border of the bason is a lofty rock, called *Sumboe Munk*, noted for the multitude of birds which frequent it. On one side, the water is only 3 or 4 fathoms deep; on the other 15. The danger at most times, especially in storms, is very great. Ships are irresistibly drawn in; the rudder loses its power; and the waves beat as high as the masts; so that an escape is almost miraculous: yet at the reflux, and in very still weather, the inhabitants will venture in boats for the sake of fishing.

FERROL, a sea-port town of Spain, in the province of Gallicia, seated on a bay of the Atlantic ocean. It has a good harbour, and is frequented by the Spanish fleet in time of war. W. Long. 8. 46. N. Lat. 43. 26.

FERRUGINOUS, any thing partaking of iron, or which contains particles of that metal.

FERRUGO, RUST. See RUST.

FERRUM, IRON. See IRON.

FERRY, a liberty by prescription, or by the king's grant, to have a boat for passage, on a frith or river, for carrying passengers, horses, &c. over the same for a reasonable toll.

FERTILITY, that quality which denominates a thing fruitful or prolific.

Nothing can produce fertility in either sex, but what promotes perfect health: nothing but good blood, spirits, and perfect animal functions, that is, high health, can beget perfect fecundity; and therefore, all means and medicines, all nostrums and specifics, to procure fertility, different from those which procure good blood and spirits, are arrant quackery. Dr Cheyne says, that water-drinking males are very rarely infertile; and that if any thing in nature can prevent infertility, and bring fine children, it is a milk and seed diet persevered in by both parents.

To increase the fertility of *vegetables*, says lord Bacon, we must not only increase the vigour of the earth and of the plant, but also preserve what would otherwise be lost: whence he infers, that there is much saved by setting, in comparison of sowing. It is reported, continues he, that if nitre be mixed with water to the thickness of honey, and after a vine is cut, the bud be anointed therewith, it will sprout within eight days. If the experiment be true, the cause may be in the opening of the bud, and contiguous parts, by the spirit of the nitre; for nitre is the life of vegetables.

How far this may be true, is not perhaps sufficiently shown, notwithstanding the experiments of Sir Kenelm Digby and M. Homberg. Consult Mr Evelyn's Sylva, the Philosophical Transactions, the French Memoirs, and Dr Stahl's Philosophical Principles of Chemistry; but a proper set of accurate experiments seems still wanting in this view.

FERULA, a little wooden pallet or slice, reputed the schoolmaster's sceptre, wherewith he chastises the boys, by striking them on the palm of the hand. The word is Latin, and has also been used to denote the prelate's crosier and staff. It is supposed to be formed of the Latin, *ferire*, "to strike." Under the eastern empire, the ferula was the emperor's sceptre, as is seen on divers medals; it consists of a long stem or shank, and a flat square head. The use of the ferula is very ancient among the Greeks, who used to call their princes ραβδικηφοροι, q. d. "ferula-bearers."

Ferula || Fescino.

In the ancient eastern church, ferula or *narthex* signified a place separated from the church; wherein the penitents or the catechumens of the second order, called *auscultantes*, ακροαματικοι, were kept, as not being allowed to enter the church; whence the name of the place, the persons therein being under penance or discipline: *sub* ferula *erant ecclesiæ*.

FERULA, *Fennel-giant*, in botany: A genus of the digynia order, belonging to the pentandria class of plants; and in the natural method ranking under the 45th order, *Umbellatæ*. The fruit is oval, compressed plane, with three striæ on each side. There are nine species; all of them herbaceous perennials, rising from three to ten or twelve feet high, with yellow flowers. They are propagated by seeds, which should be sown in autumn; and, when planted out, ought to be four or five feet distant from each other, or from any other plants; for no other will thrive under their shade. The drug assafetida is obtained from a species of ferula; though not peculiarly, being also produced by some other plants.

FESCENNIA, or FESCENNIUM, (anc. geog.), a town of Etruria, above Falerii; where the Fescennine verses were first invented. Now *Galese*, in the Ecclesiastical State, near the Tiber.

FESCENNINE VERSES, in antiquity, were a kind of satirical verses, full of wanton and obscene expressions, sung or rehearsed by the company, with many indecent gestures and dances, at the solemnization of a marriage among the Romans; (*Hor.* ep. i. lib. v. 145.) The word is borrowed, according to Macrobius, from *fascinum*, "a charm;" the people taking such songs to be proper to drive away witches, or prevent their effect; but its more probable origin is from Fescennium, a city of Campania, where such verses were first used.

FESSE, in heraldry, one of the nine honourable ordinaries. See HERALDRY.

Fesse-Point, is the exact centre of the escutcheon. See POINT.

Fesse-Ways, or *in Fesse*, denotes any thing borne after the manner of a fesse; that is, in a rank across the middle of the shield.

Party per Fesse, implies a parting across the middle of the shield, from side to side, through the fesse point.

FESTI DIES, in Roman antiquity, certain days in the year, devoted to the honour of the gods.

Numa, when he distributed the year into 12 months, divided the same into the *dies festi*, *dies profesti*, and *dies intercisi*.

The festi were again divided into days of sacrifices, banquets, games, and feriæ. See FERIÆ.

The *profesti* were those days allowed to men for the administration of their affairs, whether of a public or private nature: these were divided into fasti, comitiales, &c. See FASTI, COMITIALES, &c.

The *intercisi* were days common both to gods and men, some parts of which were allotted to the service of the one, and some to that of the other.

FESTINO, in logic, the third mood of the second figure of the syllogism, the first proposition whereof is an

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Feſtival || Fetus.

an univerſal negative, the ſecond a particular affirmative, and the third a particular negative; as in the following example:

FES No bad man can be happy.
TI Some rich men are bad men.
NO *Ergo*, ſome rich men are not happy.

FESTIVAL, a time of feaſting: See FEAST.—The term is particularly applied to anniverſary days of civil or religious joy.

FESTOON, in architecture and ſculpture, &c. an ornament in form of a garland of flowers, fruits, and leaves, intermixed or twiſted together.

It is in the form of a ſtring or collar, ſomewhat biggeſt in the middle, where it falls down in an arch; being extended by the two ends, the extremities of which hang down perpendicularly.

Feſtoons are now chiefly uſed in friezes, and other vacant places which want to be filled up and adorned; being done in imitation of the long cluſters of flowers, which the ancients placed on the doors of their temples and houſes on feſtival occaſions.

FESTUCA, FESCUE, in botany: A genus of the digynia order, belonging to the triandria claſs of plants; and in the natural method ranking under the 34th order, *Gramina*. The calyx is bivalved; and the ſpicula or partial ſpike is oblong and a little roundiſh, with the glumes acuminated. There are 16 ſpecies; two of which, as being the moſt remarkably uſeful, are deſcribed under the article AGRICULTURE, n° 53—58. Another ſpecies, called the *fluitans*, or *floating feſcue*, from its growing in wet ditches and ponds, is remarkable for the uſes that are made of its ſeeds. Theſe ſeeds are ſmall, but very ſweet and nouriſhing. They are collected in ſeveral parts of Germany and Poland, under the name of *manna ſeeds*; and are uſed at the tables of the great, in ſoups and gruels, on account of their nutritious quality and grateful flavour. When ground to meal, they make bread very little inferior to that in common uſe. The bran, ſeparated in preparing the meal, is given to horſes that have worms; but they muſt be kept from water for ſome hours afterwards. Geeſe are alſo very fond of theſe ſeeds.—Mr Lightfoot recommends this as a proper graſs to be ſown in wet meadows.

FESTUS (Pompeius), a celebrated grammarian of antiquity, who abridged a work of Verrius Flaccus, *De Significatione Verborum*; but took ſuch liberties in caſtration and criticiſing, as, Gerard Voſſius obſerves, are not favourable to the reputation of his author. A complete edition of his fragments was publiſhed by M. Dacier in 1681, for the uſe of the Dauphin. Scaliger ſays, that Feſtus is an author of great uſe to thoſe who would attain the Latin tongue with accuracy.

FETLOCK, in the manege, a tuft of hair growing behind the paſtern joint of many horſes; for thoſe of a low ſize have ſcarce any ſuch tuft.

FETTI (Domenico), an eminent painter in the ſtyle of Julio Romano, was born at Rome in 1589, and educated under Ludovico Civoli of Florence. He painted but little for churches, but excelled in hiſtory; his pictures are much ſought after, and are ſcarce. He abandoned himſelf to diſorderly courſes; and put an end to his life, by exceſſes, in the 35th year of his age.

FETUS. See FOETUS.

FEUD, in our ancient cuſtoms, is uſed for a capital quarrel or enmity, not to be ſatisfied but with the death of the enemy; and thence uſually called *deadly feud*.—*Feud*, called alſo *feida*, and *faida*, in the original German ſignifies *güerram*, i. e. *bellum*, "war." Lambert writes it *feeth*, and ſaith it ſignifies *capitales inimicitias*, or "implacable hatred."

Feud || Feverſham.

In Scotland, and the north of England, feud is particularly uſed for a combination of kindred, to revenge the death of any of their blood, againſt the killer and all his race, or any other great enemy.

FEUD (*Feoda*), the ſame with *Fief*, or *Fee*. See *FEODAL Syſtem*.

FEUDAL, or FEODAL, of or belonging to a feud or fee. See FEODAL.

FEUDATORY, or FEODATORY, a tenant who formerly held his eſtate by feodal ſervice. See *Feodal TENURE*.

FEU-DUTY, in Scots law, is the annual rent or duty which a vaſſal, by the tenor of his right, becomes bound to pay to his ſuperior.

Feu-Holding, in Scots law, is that particular tenure by which a vaſſal is taken bound to pay an annual rent or feu-duty to his ſuperior.

FEVER. See (*Index* ſubjoined to) MEDICINE.

The ancients deified the diſeaſes as well as the paſſions and affections of men. Virgil places them in the entrance into hell, *Æn.* vi. 273. Among theſe, *Fever* had a temple on mount Palatine, and two other parts of ancient Rome; and there is ſtill extant an inſcription to this goddeſs. FEBRI. DIVÆ. FEBRI. SANCTÆ. FEBRI. MAGNÆ. CAMILLA. AMATA. PRO. FILIO. MALE. AFFECTO.

FEVER, in farriery. See there, ſect. viii.

FEVERFEW, in botany. See MATRICARIA.

FEVERSHAM, a town of the county of Kent in England, ſituated on a branch of the river Thames, which is navigable for boys. It was a royal demeſne A. D 811, and called in Kenulf's charter the *King's little Town*, though it is now a large one. It was inhabited by the Britons long before the invaſion of Cæſar. In 903, king Athelſtan held a great council here. King Stephen erected a ſtately abbey, 1147, whoſe abbots ſat in parliament; and he was buried in it, together with Maud his queen, and Euſtace his ſon; but of this building two mean gate-houſes are all that now remain. The town was firſt incorporated by the name of the Barons of Feverſham, afterwards by Henry VIII. with the title of the mayor and commonalty, and laſtly by that of the mayor and jurats and commonalty. It is a populous flouriſhing place, conſiſting chiefly of two long broad ſtreets, with a market-houſe in the centre, built 1574. Its ancient church was rebuilt in 1754, at the expence of 2300l. but was originally built in Edward II.'s reign. There is a free grammar-ſchool in the place, built and endowed by Queen Elizabeth in 1582; alſo two charity-ſchools. It is a member of the cinque-port of Dover, and has a manufactory of gunpowder. The London markets are ſupplied from hence with abundance of apples and cherries, and the beſt oyſters for ſtewing. Theſe laſt are alſo fetched away in ſuch quantities by the Dutch, that a prodigious number of men and boats are employed here in the winter to dredge for them; and

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Fevillea || Fez.

and it is said they carry home as many as amount to above 2000 l. a-year. The fishermen will admit none to take up their freedom but married men.

FEVILLEA, in botany: A genus of the pentandria order, belonging to the dioecia class of plants; and in the natural method ranking under the 34th order, *Cucurbitaceæ*. The male calyx is quinquefid; the corolla the same; there are five stamina; and the nectarium consists of five filaments connivent or closing together. The female calyx is quinquefid; the styles are three; and the fruit is an hard trilocular apple with an hard bark.

FEVRE (Tanegui le), of Caen in Normandy, born 1615, was an excellent scholar in the Greek and Roman learning. Cardinal de Richelieu gave him a pension of 2000 livres to inspect all the works published at the Louvre, and designed to have made him principal of a college he was about to erect at Richelieu. But the cardinal's death cut off his hopes; and Cardinal Mazarine having no great relish for learning, his pension was ill-paid. Some time after, the Marquis de Franciere, governor of Langres, took him along with him to his government, and there he embraced the Protestant religion; after which he was invited to Saumur, where he was chosen Greek professor. He there taught with extraordinary reputation. Young men were sent to him from all the provinces in the kingdom, and even from foreign countries, while divines and professors themselves gloried in attending his lectures. He was preparing to go to Heidelberg, whither he was invited by the prince Palatine, when he died, aged 57. He wrote, 1. Notes on Anacreon, Lucretius, Longinus, Phædrus, Justin, Terence, Virgil, Horace, &c. 2. A short account of the lives of the Greek poets. 3. Two volumes of letters; and many other works.

Fevre (Claud le), an eminent French painter, was born at Fountainbleau in 1633, and studied in the palace there, and then at Paris under Le Sueur and Le Brun; the latter of whom advised him to adhere to portraits, for which he had a particular talent, and in his style equalled the best masters of that country. He died in England in 1675, aged 42.

FEZ, the capital of a kingdom of the same name in Barbary, in Africa. It is described as a very large place, surrounded with high walls, within which there are hills and valleys, only the middle being level and flat. The river, which runs through the city, is divided into two streams, from which canals are cut into every part of the town; so that the mosques, colleges, palaces, and the houses of great men, are amply supplied with water. They have generally square marble basons in the middle of the court of their houses, which are supplied with water by marble pipes that pass through the walls. They constantly run over, and the stream returns back into the street, and so into the river. The houses are built with brick or stone; and are adorned on the outside with fine Mosaic work, or tiles like those of Holland. The wood-work and ceilings are carved, painted, and gilt. The roofs are flat; for they sleep on the tops of the houses in summer. Most of the houses are two stories high, and some three. There are piazzas and galleries running all round the court on the inside, so that you may go under cover from one apartment to another. The pillars are of brick, covered with glazed tiles, or of marble, with arches between. The timber-work is carved and painted with gay colours, and most of the rooms have marble cisterns of water. Some of the great men build towers over their houses several stories high, and spare no expence to render them beautiful; from hence they have a fine prospect all over the city. Fez.

There are in this city 700 mosques, great and small; 50 of which are magnificent, and supported with marble pillars, and other ornaments. The floors are covered with mats, as well as the walls to the height of a man. Every mosque has a tower or minaret, like those in Turkey, with a gallery on the top, from whence they call the people to prayers. The principal mosque is near a mile and a half in circumference. The middle building is 150 yards in length, and 80 in breadth, with a tower proportionably high. Round this to the east, west, and north, there are great colonades 30 or 40 yards long. There are 900 lamps lighted every night; and in the middle of the mosque are large branches, which are capable of holding 500 lamps each. Along the walls are seven pulpits, from which the doctors of the law teach the people. The business of the priest is only to read prayers, and distribute alms to the people; to support which, there are large revenues.

Besides the mosques, there are two colleges built in the Moorish manner, and adorned with marble and paintings. In one of them there are 100 rooms, besides a magnificent hall. In this there is a great marble vase full of water, adorned with marble pillars of various colours, and finely polished. The capitals are gilt, and the roof shines with gold, azure, and purple. The walls are adorned with Arabic verses in gold characters. The other colleges are not near so beautiful, or rather all are gone to ruin since the neglect of learning.

There are hospitals in the city, where formerly all strangers were maintained three days *gratis*. But the estates belonging to them have been confiscated for the emperor's use. There are above 100 public baths, many of which are stately buildings. People of the same trade or business live in streets by themselves.

Though the country about Fez is pleasant and fertile, and in many places abounding with corn and cattle, yet a great part of it lies waste and uncultivated, not so much for want of inhabitants as from the oppression of the governors; which makes the people choose to live at some distance from the high roads, where they cultivate just as much land as is necessary for their own subsistence.

Round the city there are fine marble tombs, monuments, and gardens full of all manner of fruit-trees.

Such are the common accounts of this city. The following are given by M. Chenier in his *Recherches Historiques sur les Maures*.

Fez was built in the end of the eighth century by Edris, a descendant of Mahomet and of Ali; whose father, in order to avoid the proscriptions of the calif Abdallah, retired to the extremity of Africa, and was proclaimed sovereign by the Moors. Sidy Edris, having succeeded to the throne of his father, built the city of Fez in the year 793. He caused a mosque to be erected, in which his body was interred, and the city ever afterwards became an asylum for the Moors, and a place of devotion. In the first moments of fer-

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Fez. vour which a new worſhip inſpires, another moſque was built called *Carubin*, which is perhaps one of the largeſt and moſt beautiful edifices in Africa. Several others were ſucceſſively built, beſides colleges and hoſpitals; and the city was held in ſuch veneration, that when the pilgrimage to Mecca was interrupted in the fourth century of the Hegira, the weſtern Mahometans ſubſtituted that of Fez in its ſtead, while the eaſtern people went to Jeruſalem.

When the Arabs had overſpread Aſia, Africa, and Europe, they brought to Fez the little knowledge they had acquired in the ſciences and arts; and that capital conjoined, with the ſchools of religion, academies where philoſophy was taught, together with medicine and aſtronomy. This laſt gradually degenerated; ignorance brought aſtrology into repute, and this quickly engendered the arts of magic and divination.

Fez ſoon became the common reſort of all Africa. The Mahometans went thither for the purpoſes of devotion; the affluence of ſtrangers introduced a taſte for pleaſure; libertiniſm quickly followed; and, as its progreſs is moſt rapid in warm countries, Fez, which had been the nurſe of ſciences and arts, became a harbour for every kind of vice. The public baths, which health, cleanlineſs, and cuſtom, had rendered neceſſary, and which were every where reſpected as ſacred places, became ſcenes of debauchery; where men introduced themſelves in the habit of women; youths, in the ſame diſguiſe, with a diſtaff in their hands, walked the ſtreets at ſunſet in order to entice ſtrangers to their inns, which were leſs a place of repoſe than a convenience for proſtitution.

The uſurpers who diſputed the kingdom of Fez after the 16th century overlooked theſe abuſes, and contented themſelves with ſubjecting the maſters of the inns to furniſh a certain number of cooks for the army. It is to this laxity of diſcipline that Fez owed its firſt ſplendour. As the inhabitants are beautiful, the Africans flocked thither in crowds; the laws were overturned, morals deſpiſed, and vice itſelf turned into an engine of political reſource. The ſame ſpirit, the ſame inclinations, the ſame depravity, ſtill exiſt in the hearts of all the Moors. But libertiniſm is not now encouraged: it wears there, as in other places, the maſk of hypocriſy; and dares not venture to ſhow itſelf in the face of day.

The Mahometans of Andaluſia, thoſe of Granada and Cordoua, migrated to Fez during the different revolutions that agitated Spain: they carried with them new cuſtoms and new arts, and perhaps ſome ſlight degree of civilization. The Spaniſh Moors carried from Cordoua to Fez the art of ſtaining goat and ſheep ſkins with a red colour, which were then called Cordoua leather, and now Morocco leather, from that city where the art is leſs perfect. They manufacture gauzes at Fez, ſilk ſtuffs, and girdles elegantly embroidered with gold and ſilk, which ſhow how far their ingenuity might be carried if induſtry were more encouraged.

There is ſtill ſome taſte for ſtudy preſerved at Fez, and the Arabic language is ſpoken there in greater purity than in any other part of the empire. The rich Moors ſend their children to the ſchools at Fez, where they are better inſtructed than they could be elſewhere.

Leo Africanus, in the 16th century, gave a magnificent deſcription of this city, from which moſt of thoſe that have been afterwards made are copied: but its ſituation, its ſchools, and the induſtry and great urbanity of its inhabitants, are the only circumſtances that give it any preference to the other cities of the empire. There are ſome pretty convenient inns here, conſiſting of two or three ſtories. The houſes have no elegance externally: the ſtreets are ill paved, and ſo ſtrait that two perſons riding abreaſt can hardly paſs. The ſhops are like ſtalls; and have no more room in them than is ſufficient to ſerve for the owner, who is always ſeated with his wares around him, which he ſhows to the paſſengers. But though the Moors of Fez are more civilized than the reſt, they are vain, ſuperſtitious, and intolerant; and an order muſt be obtained from the emperor before a Chriſtian or a Jew can be allowed to enter the city. Fez ‖ Fibre.

The ſituation of Fez is exceedingly ſingular. It lies in the bottom of a valley ſurrounded by little hills in the ſhape of a funnel; the declivities are divided into gardens planted with tall trees, orange ſhrubs, and all ſorts of fruit-trees; a river meanders along the declivity, and turns a number of mills, which diſperſe the water abundantly to all the gardens, and almoſt to every houſe. The deſcent to the city, which ſtands in the centre, is long; and the road lies through theſe gardens, which it traverſes, in a ſerpentine direction.

The gardens, ſeen from the city, form a moſt delightful amphitheatre. Formerly each garden had a houſe in which the inhabitants ſpent the ſummer. Theſe houſes were deſtroyed in the times of the civil wars, and in the revolutions to which Fez has been ſubject, and few individuals have reſtored them. The ſituation of Fez, however, cannot be healthful; moiſt vapours fill the air in ſummer, and fevers are exceedingly common.

On the heighth above Fez, in a plain ſuſceptible of rich cultivation, ſtands New Fez, finely ſituated, and enjoying excellent air, containing ſome old palaces, in which the children of the emperor live, and where he ſometimes reſides himſelf. New Fez is inhabited by ſome Mooriſh families, but by a greater number of Jews.

Fez is ſeated on the river Cebu, W. Long. 4. 25. N. Lat. 33. 58.

FEWEL. See FUEL.

FIASCONE, a town of Italy in the territories of the pope, remarkable for its good wine. E. Long. 13. 12. N. Lat. 42. 20.

FIAT, in law, a ſhort order or warrant ſigned by a judge, for making out and allowing certain proceſſes.

FIBRARIÆ, a claſs of foſſils, naturally and eſſentially ſimple, not inflammable nor ſoluble in water; and compoſed of parallel fibres, ſome ſhorter, others longer; their external appearance being bright, and in ſome degree tranſparent: add to this, that they never give fire with ſteel, nor ferment with or are ſoluble in acid menſtrua.

FIBRE, in anatomy, a perfectly ſimple body, or at leaſt as ſimple as any thing in the human ſtructure; being fine and ſlender like a thread, and ſerving to form other parts. Hence ſome fibres are hard, as the bony ones; and others ſoft, as thoſe deſtined for the formation of all the other parts.

The fibres are divided alſo, according to their ſituation, into ſuch as are ſtraight, oblique, tranſverſe, annular,

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Fibre || Ficoides.

nular, and ſpiral; being found arranged in all theſe directions in different parts of the body.

FIBRE is alſo uſed to denote the ſlender FILAMENTS which compoſe other bodies, whether animal, vegetable, or mineral; but more eſpecially the capillary roots of plants.

FIBROSE, or FIBROUS, ſomething conſiſting of fibres, as the roots of plants. See ROOT.

FIBULA, in anatomy, the outer and ſlenderer of the two bones of the leg. See ANATOMY, n° 62.

FIBULA, in ſurgery, an inſtrument in uſe among the ancients for the cloſing of gaping wounds.—Celſus ſpeaks of the fibula as to be uſed when the wound was ſo patent as not eaſily to admit of being ſewed. (*Op.* lib. vii. cap. 25. *apud fin.*)

FIBULA, in antiquity, was a ſort of button, buckle, or claſp, made uſe of by the Greeks and Romans for keeping cloſe or tying up ſome part of their cloaths. They were of various forms, and often adorned with precious ſtones. Men and women wore them in their hair and at their ſhoes. Players and muſicians, by way of preſerving the voices of children put under their care to learn their arts, uſed to keep cloſe the prepuce with a fibula, leſt they ſhould have commerce with women.

FICINUS (Marſilius), a celebrated Italian, was born at Florence in 1433, and educated at the expence of Laurence de Medicis. He attained a perfect knowledge of the Greek and Latin tongues, and became a great philoſopher, a great phyſician, and a great divine. He was in the higheſt favour with Laurence and Coſmo de Medicis, who made him a canon of the cathedral church of Florence. He applied himſelf intenſely to the ſtudy of philoſophy; and while others were ſtriving who ſhould be the deepeſt read in Ariſtotle, who was then the philoſopher in faſhion, he devoted himſelf wholly to Plato. He was indeed the firſt who reſtored the Platonic philoſophy in the weſt; for the better effecting of which, he tranſlated into Latin the whole works of Plato. There goes a ſtory, but we know not how true it is, that when he had finiſhed his tranſlation, he communicated it to his friend Marcus Muſurus, to have his approbation of it; but that, Muſurus diſliking it, he did it all over again. He next tranſlated Plotinus; and afterwards the works, or part of them at leaſt, of Proclus, Jamblicus, Porphyrius, and other celebrated Platoniſts.—In his younger years, Ficinus lived like a philoſopher; and too much ſo, as is ſaid, to the neglect of piety. However, Savanorola coming to Florence, Ficinus went with every body elſe to hear his ſermons; and while he attended them for the ſake of the preacher's eloquence, he imbibed a ſtrong ſenſe of religion, and devoted himſelf henceforward more eſpecially to the duties of it. He died at Correggio in 1499; and, as Baronius aſſures us upon the teſtimony of what he calls credible authors, appeared immediately after his death to his friend Michael Mercatus: to whom, it ſeems, he had promiſed to appear, in order to confirm what he had taught concerning the immortality of the ſoul. His writings, ſacred and profane, which are very numerous, were collected and printed at Venice in 1516, at Baſil in 1561 and 1576, and at Paris 1641, in two vols folio. Twelve books of his Epiſtles, among which are many treatiſes, were printed ſeparately in folio at Venice 1495, and at Nuremberg 1497, in 4to.

FICOIDES, a name given to ſeveral diſtinct plants, as the meſembryanthemum, muſa, and opuntia. See MESEMBRYANTHEMUM, &c.

Fiction. Ficus.

FICTION. See FABLE and POETRY.

FICUS, the FIG-TREE: A genus of the tricœcia order, belonging to the polygamia claſs of plants; and in the natural method ranking under the 53d order, *Scabridæ*. The receptacle is common, turbinated, carnous, and connivent; incloſing the florets either in the ſame or in a diſtinct one. The male calyx is tripartite; no corolla; three ſtamina: The female calyx is quinquepartite; no corolla; one piſtil; and one ſeed.—There are ten ſpecies, of which the following are the moſt remarkable.

1. The Carica, or common Fig, with an upright ſtem branching 15 or 20 feet high, and garniſhed with large palmated or hand-ſhaped leaves. Of this there are a number of varieties; as the common fig, a large, oblong, dark purpliſh blue fruit, which ripens in Auguſt either on ſtandards or walls, and the tree carries a great quantity of fruit.—The brown or cheſtnut fig; a large, globular, cheſtnut-coloured fruit, having a purpliſh delicious pulp, ripening in July and Auguſt.—The black Iſchia fig; a middle-ſized, ſhortiſh, flat-crowned, blackiſh fruit, having a bright pulp; ripening in the middle of Auguſt.—The green Iſchia fig; a large, oblong, globular-headed, greeniſh fruit, ſlightly ſtained by the pulp to a reddiſh-brown colour; ripens in the end of Auguſt.—The brown Iſchia fig; a ſmall, pyramidal, browniſh-yellow fruit, having a purpliſh very rich pulp; ripening in Auguſt and September.—The Malta fig; a ſmall flat-topped brown fruit, ripening in the middle of Auguſt or beginning of September.—The round brown Naples fig; a globular, middle-ſized, light-brown fruit, and browniſh pulp; ripe in the end of Auguſt.—The long, brown, Naples fig; a long dark-brown fruit, having a reddiſh pulp; ripe in September.—The great blue fig; a large blue fruit, having a fine red pulp.—The black Genoa fig; a large, pear-ſhaped, black-coloured fruit, with a bright red pulp; ripe in Auguſt.

2. The Sycamorus, or Sycamore of ſcripture. According to Mr Haſſelquiſt, this is a huge true, the ſtem being often 50 feet round. The fruit is pierced in a remarkable manner by an inſect. There is an opening made in the calyx near the time the fruit ripens, which is occaſioned in two different ways. 1. When the ſquamæ, which cover the calyx, wither and are bent back; which, however, is more common to the carica than the ſycamore. 2. A little below the ſcales, on the ſide of the flower-cup, there appears a ſpot before the fruit is ripe: the fruit in this place is affected with a gangrene which extends on every ſide, and frequently occupies a finger's-breadth. It withers; the place affected becomes black; the fleſhy ſubſtance in the middle of the calyx, for the breadth of a quill, is corroded; and the male bloſſoms, which are neareſt to the bare ſide, appear naked, opening a way for the inſect, which makes ſeveral furrows in the inſide of the fruit, but never touches the ſtigmata, though it frequently eats the germen. The wounded or gangrenous part is at firſt covered or ſhut up by the bloſſoms; but the hole is by degrees opened and enlarged of various ſizes in the different fruits; the margin and ſides being always gangrenous, black, hard, and turned inwardly. The ſame gangrenous appearance is alſo

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Ficus. found near the ſquammæ, after the inſect has made a hole in that place. The tree is very common in the plains and fields of Lower Egypt. It buds in the latter end of March, and the fruit ripens in the beginning of June. It is wounded or cut by the inhabitants at the time it buds; for without this precaution, they ſay it would not bear fruit.

3. The Religioſa, or Banian-tree, is a native of ſeveral parts of the Eaſt Indies. It hath a woody ſtem, branching to a great height and vaſt extent, with heart-ſhaped entire leaves ending in acute points. Of this tree the following lines of Milton contain a deſcription equally beautiful and juſt:

——There ſoon they choſe
The fig-tree; not that tree for fruit renown'd,
But ſuch as, at this day to Indians known
In Malabar or Decan, ſpreads her arms,
Branching ſo broad and long, that in the ground
The bended twigs take root, and daughters grow
About the mother tree, a pillar'd ſhade,
High over arch'd, and echoing walks between:
There oft the Indian herdſman, ſhunning heat,
Shelters in cool, and tends his paſturing herds
At loop-holes cut through thickeſt ſhade.
PAR. LOST, Book ix. l. 1100.

The Banian-tree, or Indian fig, is perhaps the moſt beautiful of Nature's productions in that genial climate, where ſhe ſports with the greateſt profuſion and variety. Some of theſe trees are of amazing ſize and great extent, as they are continually increaſing, and, contrary to moſt other things in animal and vegetable life, they ſeem to be exempted from decay. Every branch from the main body throws out its own roots; at firſt, in ſmall tender fibres, ſeveral yards from the ground: theſe continually grow thicker until they reach the ſurface; and there ſtriking in, they increaſe to large trunks, and become parent-trees, ſhooting out new branches from the top: theſe in time ſuſpend their roots, which, ſwelling into trunks, produce other branches; thus continuing in a ſtate of progreſſion as long as the earth, the firſt parent of them all, contributes her ſuſtenance. The Hindoos are peculiarly fond of the Banian-tree; they look upon it as an emblem of the Deity, from its long duration, its out-ſtretching arms, and overſhadowing beneficence; they almoſt pay it divine honours, and,

"Find a fane in every ſacred grove."

Near theſe trees the moſt eſteemed pagodas are generally erected; under their ſhade the Brahmins ſpend their lives in religious ſolitude; and the natives of all caſts and tribes are fond of recreating in the cool receſſes, beautiful walks, and lovely viſtas of this umbrageous canopy, impervious to the hotteſt beams of a tropical ſun.

A remarkable large tree of this kind grows on an iſland in the river Nerbedda, ten miles from the city of Baroche in the province of Guzerat, a flouriſhing ſettlement lately in poſſeſſion of the Eaſt India company, but ceded by the government of Bengal, at the treaty of peace concluded with the Mahrattas in 1783, to Mahdajee Scindia a Mahratta chief. It is diſtinguiſhed by the name of Cubbeer Burr, which was given it in honour of a famous ſaint. It was once much larger than at preſent; but high floods have carried away the banks of the iſland where it grows, and with them ſuch parts of the tree as had thus far extended their roots: yet what remains is about 2000 feet in circumference, meaſured round the principal ſtems; the over-hanging branches, not yet ſtruck down, cover a much larger ſpace. The chief trunks of this ſingle tree (which in ſize greatly exceed our Engliſh elms and oaks), amount to 350; the ſmaller ſtems, forming into ſtronger ſupporters, are more than 3000; and every one of theſe is caſting out new branches, and hanging roots, in time to form trunks, and become the parents of a future progeny. Cubbeer Burr is famed throughout Hindoſtan for its great extent and ſurpaſſing beauty: the Indian armies generally encamp around it; and, at ſtated ſeaſons, ſolemn jatarras, or Hindoo feſtivals, are held there, to which thouſands of votaries repair from various parts of the Mogul empire. It is ſaid that 7000 perſons find ample room to repoſe under its ſhade. The Engliſh gentlemen, on their hunting and ſhooting parties, uſed to form extenſive encampments, and ſpend weeks together under this delightful pavilion, which is generally filled with green wood-pigeons, doves, peacocks, and a variety of feathered ſongſters; crowded with families of monkies performing their antic tricks; and ſhaded by bats of a large ſize, many of them meaſuring upwards of ſix feet from the extremity of one wing to the other. This tree not only affords ſhelter, but ſuſtenance, to all its inhabitants, being covered amid its bright foliage with ſmall figs of a rich ſcarlet, on which they all regale with as much delight, as the lords of creation on their more coſtly fare in their parties.

Culture. The carica is the ſpecies of ficus moſt frequently cultivated in this country, and the only one which does not require to be kept in a ſtove. It may be propagated either by ſuckers ariſing from the roots by layers, or by cuttings. The ſuckers are to be taken off as low down as poſſible; trim off any ragged part at bottom, leaving the tops entire, eſpecially if for ſtandards; and plant them in nurſery-lines at two or three feet diſtance from each other, or they may at once be planted where they are to remain; obſerving, that if they are deſigned for walls or eſpaliers, they may be headed to ſix or eight inches in March, the more effectually to force out lateral ſhoots near the bottom; but, if intended for ſtandards, they muſt not be topped, but trained with a ſtem, not leſs than 15 or 18 inches for dwarf-ſtandards, a yard for half-ſtandards, and four, five, or ſix feet for full ſtandards. Then they muſt be ſuffered to branch out to form a head; obſerving, that, whether againſt walls, eſpaliers, or ſtandards, the branches or ſhoots muſt never be ſhortened unleſs to procure a neceſſary ſupply of wood: for the fruit is always produced on the upper parts of the young ſhoots; and if theſe are cut off, no fruit can be expected.—The beſt ſeaſon for propagating theſe trees by layers is in autumn; but it may be alſo done any time from October to March or April. Chooſe the young pliable lower ſhoots from the fruitful branches: lay them in the uſual way, covering the body of the layers three or four inches deep in the ground, keeping the top entire, and as upright as poſſible; and they will be rooted and fit to ſeparate from the parent in autumn; when they may be planted either in the nurſery, or where they are to remain, managing them as above directed. The time for propagating by cuttings is either in autumn at the fall of the leaf, or any time in March: chooſe well-ripened ſhoots of the preceding ſummer; ſhort, and of robuſt growth, from about 12 to 15 inches long; having an inch or two of the two-years wood at their baſe, the tops left entire; and plant

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Ficus, Fidd.

them six or eight inches deep, in a bed or border of good earth, in rows two feet asunder: and when planted in autumn, it will be eligible to protect their tops in time of hard frost, the first winter, with any kind of long loose litter.

That part of the history of the fig-tree, which for many ages was so enigmatical, namely, the *caprification*, as it is called, is particularly worthy of attention, not only as a singular phenomenon in itself, but as it has furnished one of the most convincing proofs of the reality of the sexes of plants. In brief it is this: The flowers of the fig-tree are situated within a pulpy receptacle, which we call the fig or fruit: of these receptacles, in the wild fig-tree, some have male flowers only, and others have male and female, both distinct, though placed in the same receptacle. In the cultivated fig, these are found to contain only female flowers; which are fecundated by means of a kind of gnat bred in the fruit of the wild fig-trees, which pierces that of the cultivated, in order to deposit its eggs within; at the same time diffusing within the receptacle the farina of the male flowers. Without this operation the fruit may ripen, but no effective seeds are produced: hence the garden fig can only be propagated by layers and cuttings, in those countries where the wild fig is not known. The process of thus ripening the fruit, in the oriental countries, is not left to nature, but is managed with great art, and different degrees of dexterity, so as to reward the skilful husbandman with a much larger increase of fruit than would otherwise be produced. A tree of the same size, which, in Provence, where caprification is not practised, may produce about 25 pounds of fruit, will, by that art, in the Grecian islands, bring ten times that quantity. See the article CAPRIFICATION.

Uses. Figs are a considerable article in the materia medica, chiefly employed in emollient cataplasms and pectoral decoctions. The best are those which come from Turky. Many are also brought from the south of France, where they prepare them in the following manner. The fruit is first dipped in scalding hot lye made of the ashes of the fig-tree, and then dried in the sun. Hence these figs stick to the hands, and scour them like lixivial salts; and for the same reason they excite to stool, without griping. They are moderately nutrimental, grateful to the stomach, and easier to digest than any other of the sweet fruits. They have been said to produce lice when eaten as a common food; but this seems to be entirely without foundation. The reason of this supposition seems to be, that in the countries where they grow naturally, they make the principal food of the poor people, who are generally troubled with these vermin. The wood of the sycamore is not subject to rot; and has therefore been used for making of coffins, in which embalmed bodies were put. Mr Hasselquist affirms, that he saw in Egypt coffins made of this kind of wood, which had been preserved sound for 2000 years.

FIDD, an iron pin used at sea to splice or fasten ropes together; it is made tapering and sharp at one end.

There are also fidds of wood, which are much larger than the iron ones.

The pin also in the heel of the topmast, which bears it upon the cheek-tree, is called a *fidd*.

FIDD-Hammer, is used for a hammer, the handle of which is a fidd, or made tapering into that form. Fidd & Field

FIDDLE. See VIOLIN.

FIDDLE-Wood. See CITHAREXELON.

FIDDES (Richard), a learned divine and polite writer, was born in 1671, and educated at Oxford. He was presented to the living of Halsham in Yorkshire, where he was so admired for the sweetness of his voice and the gracefulness of his delivery, that the people for several miles round flocked to his sermons. Coming to London in 1712, he was, by the favour of Dean Swift, introduced to the earl of Oxford, who made him one of his chaplains, and the queen soon after appointed him chaplain to the garrison at Hull: but losing his patrons upon the change of the ministry, he lost his chaplainship; and being obliged to apply himself to writing, composed, 1. A Body of Divinity; 2. The Life of Cardinal Wolsey; 3. A Treatise of Morality, &c. He died in 1725.

FIDE-JUSSORES *Assidui.* See ASSIDUUS.

FIDE-Jussor, in the civil law, is a surety, or one that obliges himself in the same contract with a principal, for the greater security of the creditor or stipulator.

FIDEI-COMMISSUM, in Roman antiquity, an estate left in trust with any person, for the use of another. See TRUSTEE.

FIDENA, or FIDENÆ, (anc. geog.) a town of the Sabines, five miles to the north of Rome, where traces of it are still to be seen. Fidenates, the people, (Livy.)

FIDES, FAITH or FIDELITY, one of the virtues deified by the Pagans. She had a temple near the Capitol, founded by Numa Pompilius; but no animals were offered, or blood spilt, in her sacrifices. During the performance of her rites, her priests appeared in white vestments, with their heads and hands covered with linen, to show that fidelity ought to be sacred.

FIDIUS, in Pagan worship, a god who presided over alliances and promises. This deity, which the Romans borrowed from the Sabines, was also called *Sanctus*, *Semon*, and *Semi-pater*.

FIELD, in agriculture, a piece of ground inclosed, whether for tillage or pasture.

FIELD, in heraldry, is the whole surface of the shield or the continent, so called because it containeth those atchievements anciently acquired in the field of battle. It is the ground on which the colours, bearing, metals, furs, charges, &c. are represented. Among the modern heralds, field is less frequently used in blazoning than shield or escutcheon. See the article SHIELD, &c.

FIELD-Book, in surveying, that wherein the angles, stations, distances, &c. are set down.

FIELD-Colours, in war, are small flags of about a foot and half square, which are carried along with the quarter-master general, for marking out the ground for the squadrons and battalions.

FIELD-Fare, in ornithology. See TURDUS.

FIELD-Officers, in the art of war. See OFFICER.

FIELD-Pieces, small cannons, from three to twelve pounders, carried along with an army in the field.

FIELD-Staff, a weapon carried by the gunners, about the length of a halbert, with a spear at the end; having on each side ears screwed on, like the cock of a match-lock, where the gunners screw in lighted matches when

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Field || Fife

when they are upon command; and then the field-ſtaffs are ſaid to be armed.

Field-Works, in fortification, are thoſe thrown up by an army in beſieging a fortreſs, or by the beſieged to defend the place. Such are the fortifications of camps, highways, &c.

Elyſian Fields. See Elysian.

FIELDING (Henry), a well known writer of the preſent age, ſon of lieutenant-general Fielding who ſerved under the duke of Marlborough, was born in 1707. He had four ſiſters; of whom Sarah is well known, as writer of The Adventures of David Simple. On the death of his mother, his father married again; and Sir John Fielding, who ſucceeded him in the commiſſion of the peace for Middleſex, is his brother by this marriage. Henry was ſent to ſtudy at Leyden; but a failure in his remittances obliged him to return in two years, when his own propenſity to gaiety and profuſion drove him to write for the ſtage at 20 years of age. His firſt dramatic piece, Love in ſeveral Maſques, which was well received, appeared in 1727: and all his plays and farces, to the amount of 18, were written before the year 1737; and many of them are ſtill acted with applauſe. While he was thus employed, he married a young lady with 1500 l. fortune, and inherited an eſtate of 200 l. a-year from his mother: all which, though on the plan of retiring into the country, he contrived to diſſipate in three years; and then applied himſelf to the ſtudy of the law for a maintenance. In loſing his fortune, he acquired the gout: which rendering it impoſſible for him to attend the bar, he with a ſhattered conſtitution had recourſe to many extempore applications of his pen for immediate ſupplies; until, ſoon after the late rebellion, he accepted the office of acting juſtice for Middleſex, an employment much more profitable than honourable in the public eſteem. Reduced at length by the fatigues of this office, and by a complication of diſorders, he by the advice of his phyſicians went to Liſbon, where he died in 1754. He wrote a great number of fugitive pamphlets and periodical eſſays; but is chiefly diſtinguiſhed by his Adventures of Joſeph Andrews, and Hiſtory of Tom Jones. His works have been collected and publiſhed, with his life prefixed, by Mr Murphy.

FIENUS (Thomas), an ingenious and learned phyſician, born at Antwerp in 1566. He went into Italy to ſtudy phyſic under Mercurialis and Aldrovandus; and on his return diſtinguiſhed himſelf ſo much in the univerſity of Louvain, that he was there choſen profeſſor of phyſic, and was afterwards made phyſician to the duke of Bavaria. He wrote ſeveral works, among which were, *De viribus imaginationis*; and *De formatione fœtus*. He died at Louvain in 1631.

FIERI FACIAS, in law, a writ that lies where a perſon has recovered judgment for debt or damages in the king's courts againſt one, by which the ſheriff is commanded to levy the debt and damages on the defendant's goods and chattels.

FIFE, in muſic, is a ſort of wind-inſtrument, being a ſmall pipe. See Pipe.

Fife || Figure

Fife, a county of Scotland, bounded on the weſt by Clackmannan and Perthſhire, on the north by Perthſhire only, on the north-eaſt by the river Tay, on the eaſt by the German ocean, and on the ſouth by the Frith of Forth. It is above 32 miles long, and 17 broad; though along the coaſt, from Crail to Culroſs, it extends about 40 miles in length. The face of the country is various. Towards the weſt it is mountainous, having the Lomond hills riſing to a great height; to the eaſt it is flat, well cultivated, and produces grain of all kinds in great plenty. It is full of towns; and has many good bays and harbours, which breed great number of hardy ſeamen. Formerly theſe towns carried on very extenſive trade, but now are gone into decay; though, being all royal boroughs, they ſend ſeveral members to parliament. The hills are covered with ſheep and black cattle; coal, with which the county abounds, is ſhipped off in great quantities; and the linen-manufacture is carried on to a conſiderable extent. The principal rivers are the Leven and the Eden, which produce trout and other fiſh of various kinds.—Fife is the moſt populous county in Scotland, having one full ſynod and four preſbytery-ſeats within itſelf. It ſends one member to parliament; and gives an Iriſh title of *earl* to the Duffs of Braco, the deſcendants of the ancient Thanes of Fife. Cupar is the county-town.

Fife-Rails, in a ſhip, are thoſe that are placed on baniſters, on each ſide of the top of the poop, and ſo along with haunces or falls. They reach down to the quarter-deck, and to the ſtair of the gang-way.

FIFTH, in muſic. See Interval.

FIG, or Fig-tree. See Ficus.

FIGWORT, a plant called by the botaniſts Scrophularia.

FIGURAL, Figurate, or *Figurative*, a term applied to whatever is expreſſed by obſcure reſemblances. The word is chiefly applied to the types and myſteries of the Moſaic law; as alſo to any expreſſion which is not taken in its primary and literal ſenſe.

FIGURE, in phyſics, expreſſes the ſurface or terminating extremities of any body.

Figures, in arithmetic, are certain characters whereby we denote any number which may be expreſſed by any combination of the nine digits, &c. See Arithmetic.

Figure, among divines, is uſed for the myſteries repreſented under certain types.

Figure, in dancing, denotes the ſeveral ſteps which the dancer makes in order and cadence, conſidered as they mark certain figures on the floor. See Dancing.

Figure, in painting and deſigning, denotes the lines and colours which form the repreſentation of any animal, but more particularly of a human perſonage. See the article Painting.

Figure, in the manufactures, is applied to the various deſigns repreſented or wrought on velvets, damaſks, taffaties, ſattins, and other ſtuffs and cloths.

The moſt uſual figures for ſuch deſigns are flowers, imitated from the life; or groteſques, and compartiments of pure fancy. Repreſentations of men, beaſts, birds, and landſcapes, have only been introduced ſince the taſte for the Chineſe ſtuffs, particularly thoſe called *ſurees*, began to prevail among us. It is the woof of the ſtuff that forms the figures; the warp only ſerves for the ground. In working figured ſtuffs, there is required a perſon to ſhow the workman how far

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Figure. far he muſt raiſe the threads of the warp, to repreſent the figure of the deſign with the woof, which is to be paſſed acroſs between the threads thus raiſed. This ſome call *reading the deſign*.

For the figures on tapeſtry, brocade, &c. ſee TAPESTRY, &c.

For thoſe given by the calenders, printers, &c. ſee CALENDER, &c.

FIGURE, in logic, denotes a certain order and diſpoſition of the middle term in any ſyllogiſm.

Figures are fourfold. 1. When the middle term is the ſubject of the major propoſition, and the predicate of the minor, we have what is called the firſt figure. 2. When the middle term is the predicate of both the premiſſes, the ſyllogiſm is ſaid to be in the ſecond figure. 3. If the middle term is the ſubject of the two premiſſes, the ſyllogiſm is in the third figure: and, laſtly, by making it the predicate of the major, and ſubject of the minor, we obtain ſyllogiſms in the fourth figure. Each of theſe figures has a determinate number of moods, including all the poſſible ways in which propoſitions differing in quantity or quality can be combined, according to any diſpoſition of the middle term, in order to arrive at a juſt concluſion. See LOGIC.

FIGURE, in compoſition. See ORATORY; alſo ALLEGORY, APOSTROPHE, HYPERBOLE, METAPHOR, PERSONIFICATION, &c.

Elem. of Criticiſm. *A FIGURE, the means or inſtrument conceived to be the agent.* When we ſurvey a number of connected objects, that which makes the greateſt figure employs chiefly our attention; and the emotion it raiſes, if lively, prompts us even to exceed nature in the conceptions we form of it. Take the following examples.

For Neleus' ſon Alcides' *rage* had ſlain.
A broken rock the *force* of Pirus threw.

In theſe inſtances, the rage of Hercules and the force of Pirus, being the capital circumſtances, are ſo far exalted as to be conceived the agents that produce the effects.

In the firſt of the following inſtances, hunger being the chief circumſtance in the deſcription, is itſelf imagined to be the patient.

Whoſe hunger has not taſted food theſe three days.
Jane Shore.

——As when the *force*
Of ſubterranean wind tranſports a hill. *Paradiſe Loſt.*

——As when the *potent rod*
Of Amram's ſon, in Egypt's evil day
Wav'd round the coaſt, upcall'd a pitchy cloud
Of locuſts. *Paradiſe Loſt.*

A FIGURE, which, among related objects, extends the properties of one to another. This figure is not dignified with a proper name, becauſe it has been overlooked by writers. *Giddy brink, jovial wine, daring wound,* are examples of this figure. Here are adjectives that cannot be made to ſignify any quality of the ſubſtantives to which they are joined: a *brink*, for example, cannot be termed *giddy* in a ſenſe, either proper or figurative, that can ſignify any of its qualities or attributes. When we examine attentively the expreſſion, we diſcover, that a *brink* is termed *giddy* from producing that effect in thoſe who ſtand on it: in the ſame manner, a wound is ſaid to be *daring*, not with reſpect to itſelf, but with reſpect to the boldneſs of the perſon who inflicts it: and wine is ſaid to be *jovial*, as inſpiring mirth and jollity. Thus the attributes of one ſubject are extended to another with which it is connected; and the expreſſion of ſuch a thought muſt be conſidered as a figure, becauſe the attribute is not applicable to the ſubject in any proper ſenſe. Figure.

How we are to account for this figure, which we ſee lies in the thought, and to what principle ſhall we refer it? Have poets a privilege to alter the nature of things, and at pleaſure to beſtow attributes upon a ſubject to which they do not belong? It is obſerved †, that the mind paſſeth eaſily and ſweetly along a train of connected objects; and, where the objects are intimately connected, that it is diſpoſed to carry along the good or bad properties of one to another; eſpecially when it is in any degree inflamed with theſe properties. From this principle is derived the figure under conſideration. Language, invented for the communication of thought, would be imperfect, if it were not expreſſive even of the ſlighter propenſities and more delicate feelings: but language cannot remain ſo imperfect among a people who have received any poliſh; becauſe language is regulated by internal feeling, and is gradually improved to expreſs whatever paſſes in the mind. Thus, for example, when a ſword in the hand of a coward is termed *a coward ſword*, the expreſſion is ſignificative of an internal operation; for the mind, in paſſing from the agent to its inſtrument, is diſpoſed to extend to the latter the properties of the former. Governed by the ſame principle, we ſay *liſtening* fear, by extending the attribute *liſtening* of the man who liſtens, to the paſſion with which he is moved. In the expreſſion *bold deed*, or *audax facinus*, we extend to the effect what properly belongs to the cauſe. But not to waſte time by making a commentary upon every expreſſion of this kind, the beſt way to give a complete view of the ſubject, is to exhibit a table of the different relations that may give occaſion to this figure. And in viewing the table, it will be obſerved, that the figure can never have any grace but where the relations are of the moſt intimate kind. † Vid. *Elem. of Criticiſm*, ch. ii. part 1. § 6.

1. An attribute of the cauſe expreſſed as an attribute of the effect.

Audax facinus.
Of yonder fleet a *bold* diſcovery make.
An impious mortal gave the *daring* wound.
——To my *adventrous* ſong,
That with no middle flight intends to ſoar. *Paradiſe Loſt.*

2. An attribute of the effect expreſſed as an attribute of the cauſe.

Quos periiſſe ambos *miſero* cenſebam in mari. *Plautus.*
No wonder, fallen ſuch a *pernicious* height.
Paradiſe Loſt.

3. An effect expreſſed as an attribute of the cauſe.

Jovial wine, Giddy brink, Drowſy night, Muſing midnight, Panting height, Aſtoniſh'd thought, Mournful gloom.

Caſting a dim *religious* light. MILTON, *Comus.*
And the *merry* bells ring round,
And the *jocund* rebecks ſound. MILTON, *Allegro.*

4. An attribute of a ſubject beſtowed upon one of its parts or members.

Longing arms.
It was the nightingale, and not the lark,
That pierc'd the *fearful* hollow of thine ear.
Romeo and Juliet, act 3. ſc. 7.

——Oh,

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Figure.

——Oh, lay by
Thoſe moſt ungentle looks and angry weapons:
Unleſs you mean my griefs and killing fears
Should ſtretch me out at your *relentleſs* feet.
Fair Penitent, act 3.

——And ready now
To ſtoop with *wearied* wing, and *willing* feet,
On the bare outſide of this world. *Paradiſe Loſt, b.* 3.

5. A quality of the agent given to the inſtrument with which it operates.

Why peep your *coward* ſwords half out their ſhells?

6. An attribute of the agent given to the ſubject upon which it operates.

High-climbing hill *Milton.*

7. A quality of one ſubject given to another.

Icci, *beatis* nunc Arabum invides
Gazis. *Horat. Carm l.* 1 *ode* 29.

When ſapleſs age, and weak unable limbs,
Should bring thy father to his *drooping* chair.
Shakeſpeare.

By art, the pilot through the boiling deep,
And howling tempeſt, ſteers the *fearleſs* ſhip.
Iliad, xxiii. 385.

Then, nothing loth, th' enamour'd fair he led,
And ſunk tranſported on the *conſcious* bed.
Odyſſey, viii. 337.

A *ſtupid* moment motionleſs ſhe ſtood.
Summer, l. 1336.

8. A circumſtance connected with a ſubject, expreſſed as a quality of the ſubject.

Breezy ſummit.
'Tis ours the chance of *fighting* fields to try.
Iliad, i 501.

Oh! had I dy'd before that *well-fought* wall.
Odyſſey, v. 395.

From this table it appears, that the adorning a cauſe with an attribute of the effect, is not ſo agreeable as the oppoſite expreſſion. The progreſs from cauſe to effect is natural and eaſy: the oppoſite progreſs reſembles retrograde motion*; and therefore *panting height, aſtoniſh'd thought*, are ſtrained and uncouth expreſſions, which a writer of taſte will avoid.

* See PERCEPTION *and Ideas in a Train.*

It is not leſs ſtrained, to apply to a ſubject in its preſent ſtate, an epithet that may belong to it in ſome future ſtate:

Submerſaſque obrue puppes. *Æneid,* i. 73.
And mighty *ruins* fall. *Iliad,* v. 411.
Impious ſons their *mangled* fathers wound.

Another rule regards this figure, That the property of one ſubject ought not to be beſtowed upon another with which that property is incongruous.

K. Rich.——— How dare thy joints forget
To pay their *awful* duty to our preſence?
Richard II. *act* 3. *ſc.* 6

The connection between an awful ſuperior and his ſubmiſſive dependent is ſo intimate, that an attribute may readily be tranſferred from the one to the other: but awfulneſs cannot be ſo tranſferred, becauſe it is inconſiſtent with ſubmiſſion.

Figure of Speech, as peculiarly diſtinguiſhed from the above and from thoſe firſt referred to.] Under the article *Metaphor and Allegory*, a figure of ſpeech is defined, "The uſing a word in a ſenſe different from what is proper to it;" and the new or uncommon ſenſe of the word is termed *the figurative ſenſe*. The figurative ſenſe muſt have a relation to that which is proper; and the more intimate the relation is, the figure is the more happy. How ornamental this figure is to language, will not be readily imagined by any one who hath not given peculiar attention; and therefore we ſhall endeavour to unfold its capital beauties and advantages. In the firſt place, a word uſed figuratively, or in a new ſenſe, ſuggeſts at the ſame time the ſenſe it commonly bears: and thus it has the effect to preſent two objects; one ſignified by the figurative ſenſe, which may be termed *the principal object*; and one ſignified by the proper ſenſe, which may be termed *acceſſory*: the principal makes a part of the thought; the acceſſory is merely ornamental. In this reſpect, a figure of ſpeech is preciſely ſimilar to concordant ſounds in muſic, which, without contributing to the melody, make it harmonious.

Figure. *Elem. of Criticiſm.*

To explain the matter by examples. *Youth*, by a figure of ſpeech, is termed *the morning of life*: This expreſſion ſignifies *youth*, the principal object which enters into the thought; it ſuggeſts, at the ſame time, the proper ſenſe of *morning*; and this acceſſory object, being in itſelf beautiful, and connected by reſemblance to the principal object, is not a little ornamental. *Imperious ocean* is an example of a different kind, where an attribute is expreſſed figuratively: Together with *ſtormy*, the figurative meaning of the epithet *imperious*, there is ſuggeſted its proper meaning, viz. the ſtern authority of a deſpotic prince; and theſe two are ſtrongly connected by reſemblance. Upon this figurative power of words, Vida deſcants with elegance, *Poet. lib.* iii. 44.

In the next place, this figure poſſeſſes a ſignal power of aggrandiſing an object, by the following means. Words, which have no original beauty but what ariſes from their ſound, acquire an adventitious beauty from their meaning: a word ſignifying any thing that is agreeable, becomes by that means agreeable; for the agreeableneſs of the object is communicated to its name. This acquired beauty, by the force of cuſtom, adheres to the word even when uſed figuratively; and the beauty received from the thing it properly ſignifies, is communicated to the thing which it is made to ſignify figuratively. Conſider the foregoing expreſſion *Imperious ocean*, how much more elevated it is than *Stormy ocean*.

Thirdly, This figure hath a happy effect by preventing the familiarity of proper names. The familiarity of a proper name is communicated to the thing it ſignifies by means of their intimate connection; and the thing is thereby brought down in our feeling. This bad effect is prevented by uſing a figurative word inſtead of one that is proper; as for example, when we expreſs the ſky by terming it *the blue vault of heaven*; for though no work of art can compare with the ſky in grandeur, the expreſſion, however, is reliſhed, becauſe it prevents the object from being brought down by the familiarity of its proper name. With reſpect to the degrading the familiarity of proper names, Vida has the following paſſage:

Hinc ſi dura mihi paſſus dicendus Ulyſſes,
Non illum vero memorabo nomine, ſed qui
Et mores hominum multorum vidit, et urbes,
Naufragus everſæ poſt ſæva incendia Trojæ.
Poet. lib. ii. l. 46.

Laſtly, By this figure, language is enriched, and rendered more copious; in which reſpect, were there

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Figure. no other, a figure of ſpeech is a happy invention. This property is finely touched by Vida; *Poet. lib.* iii. 90.

The beauties we have mentioned belong to every figure of ſpeech. Several other beauties peculiar to one or other ſort, we ſhall have occaſion to remark afterward.

Not only ſubjects, but qualities, actions, effects, may be expreſſed figuratively. Thus, as to ſubjects, *gates of breath* for the lips, *the watery kingdom* for the ocean. As to qualities, *fierce* for ſtormy, in the expreſſion *Fierce winter; altus* for profundus, *Altus puteus, Altum mare; breathing* for perſpiring, *Breathing plants.* Again, as to actions, The ſea *rages*, Time will *melt* her frozen thoughts, Time *kills* grief. An effect is put for the cauſe, as *lux* for the ſun; and a cauſe for the effect, as *boum labores* for corn. The relation of reſemblance is one plentiful ſource of figures of ſpeech; and nothing is more common than to apply to one object the name of another that reſembles it in any reſpect: Height, ſize, and worldly greatneſs, reſemble not each other; but the emotions they produce reſemble each other, and, prompted by this reſemblance, we naturally expreſs worldly greatneſs by height or ſize: One feels a certain uneaſineſs in ſeeing a great depth; and, hence depth is made to expreſs any thing diſagreeable by exceſs, as *depth* of grief, *depth* of deſpair: Again, height of place, and time long paſt, produce ſimilar feelings; and hence the expreſſion, *Ut altius repetam!* Diſtance in paſt time, producing a ſtrong feeling, is put for any ſtrong feeling; *Nihil mihi antiquius noſtra amicitia:* Shortneſs with relation to ſpace, for ſhortneſs with relation to time; *Brevis eſſe laboro, obſcurus fio:* Suffering a puniſhment reſembles paying a debt; hence *pendere pœnas.* In the ſame manner, light may be put for glory, ſunſhine for proſperity, and weight for importance.

Many words, originally figurative, having, by long and conſtant uſe, loſt their figurative power, are degraded to the inferior rank of proper terms. Thus the words that expreſs the operation of the mind, have in all languages been originally figurative: the reaſon holds in all, that when theſe operations came firſt under conſideration, there was no other way of deſcribing them but by what they reſembled: it was not practicable to give them proper names, as may be done to objects that can be aſcertained by ſight and touch. A *ſoft* nature, *jarring* tempers, *weight* of woe, *pompous* phraſe, *beget* compaſſion, *aſſuage* grief, *break* a vow, *bend* the eye downward, *ſhower* down curſes, *drown'd* in tears, *wrapt* in joy, *warm'd* with eloquence, *loaded* with ſpoils, and a thouſand other expreſſions of the like nature, have loſt their figurative ſenſe. Some terms there are that cannot be ſaid to be altogether figurative or altogether proper: originally figurative, they are tending to ſimplicity, without having loſt altogether their figurative power. Virgil's *Regina faucia cura*, is perhaps one of theſe expreſſions: with ordinary readers, *faucia* will be conſidered as expreſſing ſimply the effect of grief; but one of a lively imagination will exalt the phraſe into a figure.

For epitomiſing this ſubject, and at the ſame time for giving a clear view of it, Lord Kames * gives a liſt of the ſeveral relations upon which figures of ſpeech are commonly founded. This liſt he divides into two tables; one of ſubjects expreſſed figuratively, and one of attributes.

* *Elem. of Criticiſm*, II. 305.

TAB. I. *Subjects expreſſed figuratively.*

1. A word proper to one ſubject employed figuratively to expreſs a reſembling ſubject.

There is no figure of ſpeech ſo frequent, as what is derived from the relation of reſemblance. Youth, for example, is ſignified figuratively by the *morning* of life. The life of a man reſembles a natural day in ſeveral particulars: the morning is the beginning of a day, youth the beginning of life; the morning is cheerful, ſo is youth, &c. By another reſemblance, a bold warrior is termed the *thunderbolt* of war; a multitude of troubles, a *ſea* of troubles.

This figure, above all others, affords pleaſure to the mind by variety of beauties. Beſides the beauties above-mentioned, common to all ſorts, it poſſeſſes in particular the beauty of a metaphor or of a ſimile: a figure of ſpeech built upon reſemblance, ſuggeſts always a compariſon between the principal ſubject and the acceſſory; whereby every good effect of a metaphor or ſimile may, in a ſhort and lively manner, be produced by this figure of ſpeech.

2. A word proper to the effect employed figuratively to expreſs the cauſe.

Lux for the ſun; *Shadow* for cloud. A helmet is ſignified by the expreſſion *glittering terror;* a tree by *ſhadow* or *umbrage.* Hence the expreſſion,

Nec habet Pelion umbras. *Ovid.*

Where the dun umbrage hangs. *Spring, l.* 1023.

A wound is made to ſignify an arrow:

Vulnere non pedibus te conſequar. *Ovid.*

There is a peculiar force and beauty in this figure: the word which ſignifies figuratively the principal ſubject, denotes it to be a cauſe by ſuggeſting the effect.

3. A word proper to the cauſe employed figuratively to expreſs the effect.

Boumque labores for corn. *Sorrow* or *grief* for tears.

Again Ulyſſes veil'd his penſive head;
Again, unmann'd, a ſhow'r of *ſorrow* ſhed.
Streaming *Grief* his faded cheek bedew'd.

Blindneſs for darkneſs:

Cæcis erramus in undis. *Æneid.* iii. 200.

There is a peculiar energy in this figure, ſimilar to that in the former: the figurative name denotes the ſubject to be an effect, by ſuggeſting its cauſe.

4. Two things being intimately connected, the proper name of the one employed figuratively to ſignify the other.

Day for light. *Night* for darkneſs; and hence, A ſudden night. *Winter* for a ſtorm at ſea:

Interea magno miſceri murmure pontum,
Emiſſamque Hyemem ſenſit Neptunus. *Æneid.* i. 128.

This laſt figure would be too bold for a Britiſh writer, as a ſtorm at ſea is not inſeparably connected with winter in this climate.

5. A word proper to an attribute, employed figuratively to denote the ſubject.

Youth and *beauty* for thoſe who are young and beautiful:

Youth and beauty ſhall be laid in duſt.

Majeſty

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Figure.

Majeſty for the king:

What art thou, that uſurp'ſt this time of night,
Together with that fair and warlike form
In which the *Majeſty* of buried Denmark
Did ſometime march? *Hamlet, act* I. *ſc.* I.

——— Or have ye choſen this place
After the toils of battle, to repoſe
Your weary'd *virtue?* *Paradiſe Loſt.*

Verdure for a green field. *Summer, l.* 301.

Speaking of cranes,

The pigmy nations, wounds and death they bring,
And all the *war* deſcends upon the wing. *Iliad.* iii. 10.

Cool *age* advances venerably wiſe. *Iliad.* iii. 149.

The peculiar beauty of this figure ariſes from ſuggeſting an attribute that embelliſhes the ſubject, or puts it in a ſtronger light.

6. A complex term employed figuratively to denote one of the component parts.

Funus for a dead body. *Burial* for a grave.

7. The name of one of the component parts inſtead of the complex term.

Teda for a marriage. The *Eaſt* for a country ſituated eaſt from us. *Jovis veſtigia ſervat*, for imitating Jupiter in general.

8. A word ſignifying time or place, employed figuratively to denote what is connected with it.

Clime for a nation, or for a conſtitution of government: hence the expreſſion, *Merciful clime, Fleecy winter* for ſnow, *Seculum felix.*

9. A part for the whole.

The *pole* for the earth. The *head* for the perſon:

Triginta minas pro *capite* tuo dedi. *Plautus.*

Tergum for the man:

Fugiens tergum. *Ovid.*

Vultus for the man:

Jam fulgor armorum fugaces
Terret equos, equitumque vultus. *Horat.*

Quis deſiderio ſit pudor aut modus
Tam chari *capitis?* *Horat.*

Dumque virent *genua?* *Horat.*

Thy growing virtues juſtify'd my cares,
And promis'd comfort to my *ſilver hairs.* *Iliad*, ix. 616.

———Forthwith from the pole he rears
His mighty *ſtature.* *Paradiſe Loſt.*

The ſilent *heart* which grief aſſails. *Parnel.*

The peculiar beauty of this figure conſiſts in marking that part which makes the greateſt figure.

10. The name of the container, employed figuratively to ſignify what is contained.

Grove for the birds in it; Vocal *grove. Ships* for the ſeamen; Agonizing *ſhips. Mountains* for the ſheep paſturing upon them, Bleating *mountains. Zacynthus, Ithaca*, &c. for the inhabitants. *Ex maeſtis domibus*, Livy.

11. The name of the ſuſtainer, employed figuratively to ſignify what is ſuſtained.

Altar for the ſacrifice. *Field* for the battle fought upon it, Well-fought *field.*

12. The name of the materials, employed figuratively to ſignify the things made of them.

Ferrum for *gladius.*

13. The names of the Heathen deities, employed figuratively to ſignify what they patroniſe.

Jove for the air, *Mars* for war, *Venus* for beauty, *Cupid* for love, *Ceres* for corn, *Neptune* for the ſea, *Vulcan* for fire.

This figure beſtows great elevation upon the ſubject; and therefore ought to be confined to the higher ſtrains of poetry. Figure.

TAB. II. *Attributes expreſſed figuratively.*

1. When two attributes are connected, the name of the one may be employed figuratively to expreſs the other.

Purity and virginity are attributes of the ſame perſon: hence the expreſſion, *Virgin* ſnow, for pure ſnow.

2. A word ſignifying properly an attribute of one ſubject, employed figuratively to expreſs a reſembling attribute of another ſubject.

Tottering ſtate. *Imperious* ocean. *Angry* flood. *Raging* tempeſt. *Shallow* fears.

My ſure divinity ſhall bear the ſhield,
And edge thy ſword to *reap* the glorious field.
Odyſſey, xx. 61.

Black omen, for an omen that portends bad fortune.

After omen. *Virgil.*

The peculiar beauty of this figure ariſes from ſuggeſting a compariſon.

3. A word proper to the ſubject, employed to expreſs one of its attributes.

Mens for *intellectus. Mens* for a reſolution:

Iſtam, oro, exue mentem.

4. When two ſubjects have a reſemblance by a common quality, the name of the one ſubject may be employed figuratively to denote that quality in the other:

Summer life for agreeable life.

5. The name of the inſtrument made to ſignify the power of employing it:

—— ——Melpomene, cui liquidam pater
Vocem cum *cithara* dedit.

The ample field of figurative expreſſion diſplayed in theſe tables, affords great ſcope for reaſoning. Several of the obſervations relating to metaphor *, are applicable to figures of ſpeech: theſe ſhall be ſlightly retouched, with ſome additions peculiarly adapted to the preſent ſubject. * See Metaphor.

1. As the figure under conſideration is built upon relation, we find from experience, and it muſt be obvious from reaſon, that the beauty of it depends on the intimacy of the relation between the figurative and proper ſenſe of the word. A ſlight reſemblance, in particular, will never make this figure agreeable: the expreſſion, for example, *Drink down a ſecret*, for liſtening to a ſecret with attention, is harſh and uncouth, becauſe there is ſcarce any reſemblance between *liſtening* and *drinking*. The expreſſion *weighty crack*, uſed by Ben Johnſon for *loud crack*, is worſe if poſſible: a loud ſound has not the ſlighteſt reſemblance to a piece of matter that is weighty.

Phemius! let acts of gods, and heroes old,
What ancient bards in hall and bow'r have told,
Attemper'd to the lyre, your voice employ,
Such the pleas'd *ear will drink* with ſilent joy.
Odyſſey, i. 433.

Strepitumque exterritus *hauſit.* *Æneid.* vi. 559.

———————Write, my queen,
And with mine eyes I'll *drink* the words you ſend.
Cymbeline, act I. *ſc.* 2.

As thus th' effulgence tremulous I *drink.*
Summer, l. 1684.

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Figure. Neque *audit* currus habenas. *Georg.* i 514.

O prince! (Lycaon's valiant ſon reply'd),
As thine the ſteeds, be thine the taſk to guide.
The horſes practis'd to their lord's command,
Shall *bear* the rein, and anſwer to thy hand. *Iliad*, v. 288.

The following figures of ſpeech ſeem altogether wild and extravagant, the figurative and proper meaning having no connection whatever. *Moving* ſoftneſs, Freſhneſs *breathes*, *Breathing* proſpect, *Flowing* ſpring, *Dewy* light, *Lucid* coolneſs, and many others of this falſe coin, may be found in Thomſon's *Seaſons*.

2. The proper ſenſe of the word ought to bear ſome proportion to the figurative ſenſe, and not ſoar much above it, nor ſink much below it. This rule, as well as the foregoing, is finely illuſtrated by Vida, *Poet.* iii. 148.

3. In a figure of ſpeech, every circumſtance ought to be avoided that agrees with the proper ſenſe only, not with the figurative ſenſe; for it is the latter that expreſſes the thought, and the former ſerves for no other purpoſe but to make harmony:

Zacynthus green with ever-ſhady groves,
And Ithaca, preſumptuous boaſt their loves;
Obtruding on my choice a ſecond lord,
They preſs the Hymenean rite abhorr'd.
Odyſſey, xix. 152.

Zacynthus here ſtanding figuratively for the inhabitants, the deſcription of the iſland is quite out of place: it puzzles the reader, by making him doubt whether the word ought to be taken in its proper or figurative ſenſe.

——————————Write, my queen,
And with mine eyes I'll drink the words you ſend,
Though ink be made of gall. *Cymbeline*, *act* I. *ſc.* 2.

The diſguſt one has to drink ink in reality, is not to the purpoſe where the ſubject is drinking ink figuratively.

4. To draw conſequences from a figure of ſpeech, as if the word were to be underſtood literally, is a groſs abſurdity; for it is confounding truth with fiction:

Be Mowbray's ſins ſo heavy in his boſom,
That they may break his foaming courſer's back,
And throw the rider headlong in the liſts,
A caitiff recreant to my couſin Hereford.
Richard II. *act* I. *ſc.* 3.

Sin may be imagined heavy in a figurative ſenſe: but weight in a proper ſenſe belongs to the acceſſory only; and therefore to deſcribe the effects of weight, is to deſert the principal ſubject, and to convert the acceſſory into a principal:

Cromwell. How does your Grace?
Wolſey. Why, well;
Never ſo truly happy, my good Cromwell.
I know myſelf now, and I feel within me
A peace above all earthly dignities,
A ſtill and quiet conſcience. The king has cur'd me,
I humbly thank his Grace: and, from theſe ſhoulders,
Theſe ruin'd pillars, out of pity, taken
A load would ſink a navy, too much honour.
Henry VIII. *act* 3. *ſc.* 6.

Ulyſſes ſpeaking of Hector:

I wonder now how yonder city ſtands,
When we have here the baſe and pillar by us.
Troilus and Creſſida, *act* 4. *ſc.* 9.

Othello. No; my heart is turn'd to ſtone: I ſtrike it, and it hurts my hand. *Othello*, *act* 4. *ſc.* 5.

Not leſs, even in this deſpicable now,
Than when my name fill'd Afric with affrights,
And froze your hearts beneath your torrid zone.
Don Sebaſtian King of Portugal, *act* 1.

How long a ſpace, ſince firſt I lov'd, it is!
To look into a glaſs I fear,
And am ſurpris'd with wonder, when I miſs
Grey hairs and wrinkles there.
Cowley, *vol.* 1. *p.* 86.

I choſe the flouriſhing'ſt tree in all the park,
With freſheſt boughs, and faireſt head:
I cut my love into its gentle bark,
And in three days behold 'tis dead;
My very written flames ſo violent be,
They've burnt and wither'd up the tree.
Cowley, *vol.* 1. *p.* 136.

Ah, mighty Love, that it were inward heat
Which made this precious limbeck ſweat!
But what, alas! ah what does it avail
That ſhe weeps tears ſo wond'rous cold,
As ſcarce the aſs's hoof can hold,
So cold, that I admire they fall not hail?
Cowley, *vol.* 1. *p.* 152.

Such a play of words is pleaſant in a ludicrous poem.

Almeria. O Alphonſo, Alphonſo!
Devouring ſeas have waſh'd thee from my ſight,
No time ſhall raſe thee from my memory;
No, I will live to be thy monument:
The cruel ocean is no more thy tomb;
But in my heart thou art inter'd.
Mourning Bride, *act* 1. *ſc.* 1.

This would be very right, if there were any inconſiſtence in being interred in one place really, and in another place figuratively.

From conſidering, that a word uſed in a figurative ſenſe ſuggeſts at the ſame time its proper meaning, we diſcover a fifth rule, That we ought not to employ a word in a figurative ſenſe, the proper ſenſe of which is inconſiſtent or incongruous with the ſubject: for every inconſiſtency, and even incongruity, though in the expreſſion only and not real, is unpleaſant:

Interea genitor Tyberini ad fluminis undam
Vulnera *ficcabat* lymphis ——————
Æneid. x. 833.

Tres adeo incertos cæca caligine ſoles
Erramus pelago, totidem ſine ſidere noctes.
Æneid. iii. 203.

The foregoing rule may be extended to form a ſixth, That no epithet ought to be given to the figurative ſenſe of a word that agrees not alſo with its proper ſenſe:

—————— Dicat Opuntiæ
Frater Megillæ, quo *beatus*
Vulnere. *Horat. Carm. lib.* 1. *ode* 27.

Parcus deorum cultor, et infrequens,
Inſanientis dum ſapientiæ
Conſultus erro. *Horat. Carm. l.* 1. *ode* 54.

Seventhly, The crowding into one period or thought different figures of ſpeech, is not leſs faulty than crowding metaphors in that manner: the mind is diſtracted in the quick tranſition from one image to another, and is puzzled inſtead of being pleaſed:

I am of ladies moſt deject and wretched,
That ſuck'd the honey of his muſic vows. *Hamlet.*
My bleeding boſom ſickens at the ſound.
Odyſſey, i. 439.

——————Ah miſer,
Quanta laboras in *Charybdi!*
Digne puer meliore *flamma.*
Quæ ſaga, quis te ſolvere Theſſalis
Magus *venenis*, quis poterit deus?

Fig.

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Figure.

Vix illigatum tetriformi
Pegaſus expediet *Chimera*.
Horat. Carm. lib. 1. *ode* 27.

Eighthly, if crowding figures be bad, it is ſtill worſe to graft one figure upon another: For inſtance,

While his keen falchion drinks the warriors lives.
Iliad, xi. 211.

A falchion drinking the warriors blood is a figure built upon reſemblance, which is paſſable. But then in the expreſſion, *lives* is again put for *blood*; and by thus grafting one figure upon another, the expreſſion is rendered obſcure and unpleaſant.

Ninthly, Intricate and involved figures, that can ſcarce be analyſed, or reduced to plain language, are leaſt of all tolerable:

Votis incendimus aras. *Æneid.* iii. 279.
——— Onerentque caniſtris
Dona laboratæ Cereris. *Æneid.* viii. 180.

Vulcan to the Cyclopes:

Arma acri facienda viro: nunc viribus uſus,
Nunc manibus rapidis, omni nunc arte magiſtra:
Præcipitate moras. *Æneid* viii. 441.
——— Huic gladio, perque ærea ſcuta.
Per tunicam ſqualentem auro, latus *haurit* apertum.
Æneid. x 313.
Scriberis Vario fortis, et hoſtium
Victor, Mæonii carminis *alite*.
Horat. Carm. lib. 1. *ode* 6.
Elſe ſhall our fates be number'd with the dead.
Iliad, v. 294.
Commutual death the fate of war confounds.
Iliad, viii. 85. *and* xi. 117.

Speaking of Proteus.

Inſtant he wears, eluſive of the rape,
The mimic force of every ſavage ſhape. *Odyſſey*, iv. 563.
Rolling convulſive on the floor, is ſeen
The piteous object of a proſtrate queen. *Ibid.* iv, 652.
The mingling tempeſt-weaves its gloom. *Autumn*, 337.
A various ſweetneſs ſwells the gentle race. *Ibid.* 640.
The diſtant water-fall ſwells in the breeze. *Winter*, 738.

In the tenth place, When a ſubject is introduced by its proper name, it is abſurd to attribute to it the properties of a different ſubject to which the word is ſometimes applied in a figurative ſenſe:

Hear me, oh Neptune! thou whoſe arms are hurl'd
From ſhore to ſhore, and gird the ſolid world.
Odyſſey, ix. 617.

Neptune is here introduced perſonally, and not figuratively for the ocean: the deſcription therefore, which is only applicable to the latter, is altogether improper.

It is not ſufficient that a figure of ſpeech be regularly conſtructed, and be free from blemiſh: it requires taſte to diſcern when it is proper, when improper; and taſte perhaps is our only guide. One, however, may gather from reflections and experience, that ornaments and graces ſuit not any of the diſpiriting paſſions, nor are proper for expreſſing any thing grave and important. In familiar converſation, they are in ſome meaſure ridiculous: Proſpero, in the *Tempeſt*, ſpeaking to his daughter Miranda, ſays,

The fringed curtains of thine eyes advance,
And ſay what thou ſeeſt yond.

No exception can be taken to the juſtneſs of the figure; and circumſtances may be imagined to make it proper: but it is certainly not proper in familiar converſation.

Figure || Filaments.

In the laſt place, Though figures of ſpeech have a charming effect when accurately conſtructed and properly introduced, they ought, however, to be ſcattered with a ſparing hand: nothing is more luſcious, and nothing conſequently more ſatiating, than redundant ornaments of any kind.

FIGURE is uſed, in theology, for the myſteries repreſented or delivered obſcurely to us under certain types or actions in the Old Teſtament. Thus manna is held a figure or type of the euchariſt; and the death of Abel a figure of the ſuffering of Chriſt.

Many divines and critics contend, that all the actions, hiſtories, ceremonies, &c. of the Old Teſtament, are only figures, types, and prophecies, of what was to happen under the New. The Jews are ſuppoſed to have had the figures or ſhadows, and we the ſubſtance.

FIGURE is alſo applied in a like ſenſe to profane matters; as the emblems, enigmas, fables, ſymbols, and hieroglyphics, of the ancients.

FIGURED, in general, ſomething marked with figures.

The term *figured* is chiefly applied to ſtuffs, whereon the figures of flowers, and the like, are either wrought or ſtamped.

FIGURED, in muſic, is applied either to ſimple notes or to harmony: to ſimple notes, as in theſe words *figured baſs*, to expreſs a baſs whoſe notes carrying chords are ſubdivided into many other notes of leſſer value; to harmony, when, by ſuppoſition and in a diatonick procedure, other notes than thoſe which form the chord are employed. See SUPPOSITION.

To *figure* is to paſs ſeveral notes for one; to form runnings or variations; to add ſome notes to the air, in whatever manner it be done; in ſhort, it is to give to harmonious ſounds a figure of melody, by connecting them with other intermediate ſounds.

FILAGO, in botany: A genus of the polygamia ſuperflua order, belonging to the ſyngeneſia claſs of plants; and in the natural method ranking under the 49th order, *Compoſitæ*. The receptacle is naked; there is no pappus; the calyx is imbricated; the female florets placed among the ſcales of the calyx.

FILAMENT, in anatomy, natural hiſtory, &c. a term uſed in the ſame ſenſe with fibre, for thoſe fine threads whereof the fleſh, nerves, ſkin, plants, roots, &c. are compoſed. See FIBRE.

Vegetable FILAMENTS form a ſubſtance of great uſe in the arts and manufactures; furniſhing thread, cloth, cordage, &c.

For theſe purpoſes the filamentous parts of the *Cannabis* and *Linum*, or hemp and flax, are employed among us*. But different vegetables have been employed in different countries for the ſame uſes. Putrefaction deſtroys the pulpy or fleſhy matter, and leaves the tough filaments entire: By curiouſly putrefying the leaf of a plant in water, we obtain the fine flexile fibres, which conſtituted the baſis of the ribs and minute veins, and which now form as it were a ſkeleton of the leaf. Alkaline lixivia, in ſome degree, produce ſimilar effects to putrefaction.

* See *Hemp* and *Flax*; alſo *Cotton*.

The Sieur de Flacourt, in his hiſtory of Madagaſcar, relates, that different kinds of cloth are prepared

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Filaments. in that iſland from the filaments of the bark of certain trees boiled in ſtrong lye; that ſome of theſe cloths are very fine, and approach to the ſoftneſs of ſilk, but in durability come ſhort of cotton; that others are coarſer and ſtronger, and laſt thrice as long as cotton; and that of theſe the ſails and cordage of his veſſel were made. See alſo the article BARK.

The ſame author informs us, that the ſtalks of nettles are uſed for the like purpoſes in his own country, France. And Sir Hans Sloane relates, in one of his letters to Mr Ray, that he has been informed by ſeveral, that muſlin and callico, and moſt of the Indian linens, are made of nettles.

In ſome of the Swediſh provinces, a ſtrong kind of cloth is ſaid to be prepared from hop-ſtalks: and in the tranſactions of the Swediſh academy for the year 1750, there is an account of an experiment made in conſequence of that report. Of the ſtalks, gathered in autumn, about as many were taken, as equalled in bulk a quantity of flax that would have produced a pound after preparation. The ſtalks were put into water, and kept covered therewith during the winter. In March they were taken out, dried in a ſtove, and dreſſed as flax. The prepared filaments weighed nearly a pound, and proved fine, ſoft, and white: They were ſpun and woven into ſix ells of fine ſtrong cloth. The author, Mr Shiſler, obſerves, that hop-ſtalks take much longer time to rot than flax; and that, if not fully rotted, the woody part will not ſeparate, and the cloth will neither prove white nor fine.

Hemp, flax, and all other vegetable filaments, and thread or cloth prepared from them, differ remarkably from wool, hair, ſilk, and other animal productions, not only in the principles into which they are reſoluble by fire, but likewiſe in ſome of their more intereſting properties, particularly in their diſpoſition to imbibe colouring matters; ſundry liquors, which give a beautiful and durable dye to thoſe of the animal, giving no ſtain at all to thoſe of the vegetable kingdom.

A ſolution of copper in aquafortis, which had been changed blue by an addition of volatile ſpirit, on being mixed with a little ſolution of tin, became turbid and greeniſh. Pieces of white ſilk and flannel boiled, without any previous preparation, in this mixture, received a bright deep yellow dye; whilſt pieces of linen, prepared and unprepared, came out as colourleſs as they were put in.

Fiſhing-nets are uſually boiled with oak-bark or other like aſtringents, which render them more laſting. Thoſe made of flax receive from this decoction a browniſh colour, which, by the repeated alternations of water and air, is in a little time diſcharged, whilſt the fine gloſſy brown, communicated by the ſame means to ſilken nets, permanently reſiſts both the air and water, and ſtands as long as the animal filaments themſelves. In like manner the ſtain of ink, or the black dye from ſolutions of iron, mixed with vegetable aſtringents, proves durable in ſilk and woollen; but from linen, the aſtringent matter is extracted by waſhing, and only the yellow iron-mould remains.

The red decoction of cochineal, which, heightened with a little ſolution of tin, gives the fiery ſcarlet dye to wool or ſilk that have been previouſly impregnated with ſolution of tartar, makes no impreſſion upon linen or cotton prepared in the ſame manner. Mr du Fay informs us in the Memoirs of the French Academy for the year 1737, that having prepared a mixed cloth whoſe warp was of wool and the woof of cotton, and thoroughly blended the two together by fulling, he ſtill found the cotton to reſiſt the action of the ſcarlet liquor, and the wool to receive the ſame colour from it as wool by itſelf, the ſtuff coming out all over marbled fiery and white. Filaments || File.

Many other inſtances of this kind are known too well to the callico-printer; whoſe grand deſideratum it is, to find means of making linen receive the ſame colours that wool does. The phyſical cauſe of the difference is wholly unknown; and indeed, of the theory of dyes in general, we know as yet extremely little. (See DYEING.) Are animal filaments tubular, and the colouring atoms received within them? Are vegetable filaments ſolid, and the colour depoſited on the ſurface? Or does not their different ſuſceptibility of colour depend rather on the different intrinſic properties of the two? There are many inſtances of a like diverſity, even in the metallic kingdom, where a mechanical difference in texture can ſcarcely be preſumed to be the cauſe: Thus ſilver receives a deep ſtain from ſulphureous or putrid vapours, or the yolk of a boiled egg, which have no effect upon tin.

FILAMENTS, among botaniſts. See BOTANY, p. 434, col. 1.

FILANDERS, in falconry, a diſeaſe in hawks, &c. conſiſting of filaments or ſtrings of blood coagulated; and occaſioned by a violent rupture of ſome vein, by which the blood, extravaſating, hardens into theſe figures, and incommodes the reins, hips, &c.

FILANDERS, are alſo worms as ſmall as thread, and about an inch long, that lie wrapt up in a thin ſkin or net, near the reins of an hawk, apart from either gut or gorge.

This malady is known by the hawk's poverty; by ruffling her tail; by her ſtraining the ſift, or perch, with her pounces; and laſtly, by croaking in the night, when the filanders prick her. The diſeaſe proceeds from bad food; and muſt be remedied in time, to prevent its ſpreading over the whole body, and deſtroying the bird. Theſe muſt not be killed as other worms are, for fear of impoſthumes from their corruption, being incapable of paſſing away with the hawk's meat. They muſt only be ſtupified, to prevent their being offenſive; and this is done by giving the hawk a clove of garlic, after which ſhe will feel nothing of the filanders for 40 days. It will be prudent in the falconer, when he obſerves the hawk poor and low, to give her a clove of garlic once a month by way of prevention.

FILBERT, or FILBERD, the fruit of the corylus, or hazel. See CORYLUS.

FILE, among mechanics, a tool uſed in metal, &c. in order to ſmooth, poliſh, or cut.

This inſtrument is of iron or forged ſteel, cut in little furrows, with chiſſels and a mallet, this and that way, and of this or that depth, according to the grain or touch required. After cutting the file, it muſt be tempered with a compoſition of chimney-ſoot, very hard and dry, diluted and wrought up with urine, vinegar, and ſalt; the whole being reduced to the conſiſtence of muſtard. Tempering the files conſiſts in rubbing them over with this compoſition, and covering them.

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File, Filial.

them in loam; after which they are put in a charcoal fire, and taken out by that time they have acquired a cherry colour, which is known by a ſmall rod of the ſame ſteel put in along with them. Being taken out of the fire, they are thrown into cold ſpring-water; and when cold, they are cleaned with charcoal and a rag; and being clean and dry, are kept from ruſt by laying them up in wheat bran. Iron files require more heating than ſteel ones. Files are of different forms, ſizes, cuts, and degrees of fineneſs, according to the different uſes and occaſions for which they are made. See FILING.

FILE, in the art of war, a row of ſoldiers, ſtanding one behind another, which is the depth of the battalion or ſquadron. The files of a battalion of foot are generally three deep; as are ſometimes thoſe of a ſquadron of horſe. The files muſt be ſtraight and parallel one to another.

FILE, in law, a thread, ſtring, or wire, upon which writs and other exhibits in courts and offices are faſtened or filed, for the more ſafe keeping, and ready turning to the ſame. A file is a record of the court; and the filing of a proceſs of a court makes it a record of it. An original writ may be filed after judgment given in the cauſe, iſſued forth before; declarations, &c. are to be filed, and affidavits muſt be filed, ſome before they are read in court, and ſome preſently when read in court. Before filing a record removed by *certiorari*, the juſtices of B. R. may refuſe to receive it, if it appears to be for delay, &c.; and remand it back for the expedition of juſtice: but if the *certiorari* be once filed, the proceedings below cannot be revived. An indictment, &c. cannot be amended after it is filed.

FILIAL, ſomething belonging to the relation of ſon. See SON.

The divines uſually diſtinguiſh between a *ſervile* and a *filial* fear. The moſt abandoned may have a ſervile fear of God, ſuch as that of a ſlave to his maſter; but not a filial fear, *i. e.* a fear reſulting from love and reſpect. See FEAR.

FILIAL Piety, the affectionate attachment of children to their parents; including in it love, reverence, obedience, and relief. Theſe are duties prompted equally by nature and by gratitude, independent of the injunctions of religion. For where ſhall we find the perſon who hath received from any one benefits ſo great or ſo many, as children from their parents? And it may be truly ſaid, that if perſons are undutiful to their parents, they ſeldom prove good to any other relation. Profane hiſtory furniſhes many fine examples of this amiable virtue; a few of which we ſhall ſelect, according to the plan obſerved in other ſimilar articles.

1. The Roman dictator T. Manlius having exerciſed great cruelty over the citizens, was cited at the expiration of his office to anſwer for his conduct. Among other things that were laid to his charge, he was accuſed of treating with barbarity one of his own ſons. Manlius, according to Livy, had no other cauſe of complaint againſt this ſon than his having an impediment in his ſpeech. For this reaſon he was baniſhed far from the city, from his home, and the company of thoſe of his own age and fortune, and condemned to ſervile works. All were highly exaſperated againſt ſuch inhuman conduct, except the ſon himſelf, who, under the greateſt concern that he ſhould furniſh matter of accuſation againſt his father, reſolved upon a moſt extraordinary method to relieve him. One morning, without appriſing any body, he came to the city armed with a dagger, and went directly to the houſe of the tribune Pomponius, who had accuſed his father. Pomponius was yet in bed. Young Manlius ſent up his name, and was immediately admitted by the tribune, who did not doubt but he was come to diſcover to him ſome new inſtances of his father's ſeverity. But Manlius, as ſoon as he was left alone with the tribune, drew out his dagger, and preſented it to his breaſt; declaring he would ſtab him that moment if he did not ſwear in the form he ſhould dictate, "Never to hold the aſſembly of the people for accuſing his father." Pomponius, who ſaw the dagger glittering at his breaſt, himſelf alone without arms, and attacked by a robuſt young man full of a bold confidence in his own ſtrength, took the oath demanded of him; and afterwards confeſſed with a kind of complacency in the thing, and a ſincerity which ſufficiently argued he was not ſorry for what he had done, that it was that violence which obliged him to deſiſt from his deſign. *Liv. l. 7. c. 4, 5.*

2. Among the multitude of perſons who were proſcribed under the ſecond triumvirate of Rome, were the celebrated orator Cicero and his brother Quintus. The fate of the former, in endeavouring to make his eſcape, is related under the article CICERO. The latter found means to conceal himſelf ſo effectually at home, that the ſoldiers could not find him. Enraged at their diſappointment, they put his ſon to the torture, in order to make him diſcover the place of his father's concealment; but filial affection was proof againſt the moſt exquiſite torments. An involuntary ſigh, and ſometimes a deep groan, was all that could be extorted from the youth. His agonies were increaſed; but with amazing fortitude he ſtill perſiſted in his reſolution of not betraying his father. Quintus was not far off; and it may be imagined better than can be expreſſed, how his heart muſt have been affected with the ſighs and groans of a ſon expiring in tortures to ſave his life. He could bear it no longer; but quitting the place of his concealment, he preſented himſelf to the aſſaſſins, begging of them to put him to death, and diſmiſs the innocent youth, whoſe generous behaviour the triumvirs themſelves, if informed of the fact, would judge worthy of the higheſt approbation. But the inhuman monſters, without being the leaſt affected with the tears either of the father or the ſon, anſwered, that they both muſt die; the father becauſe he was proſcribed, and the ſon becauſe he had concealed his father. Then a new conteſt of tenderneſs aroſe who ſhould die firſt; but this the aſſaſſins ſoon decided, by beheading them both at the ſame time.—This anecdote is related by Appian, Dio, Plutarch, Valerius Maximus, and other hiſtorians.

3. Cinna, who ſcrupled no attempt, how atrocious ſoever, which could ſerve his purpoſe, undertook to get Pomponius Strabo murdered in his tent; but his ſon ſaved his life, which was the firſt remarkable action of Pompey the Great. The treacherous Cinna, by many alluring promiſes, had gained over one Terentius, a confident of Pompey's, and prevailed on him to aſſaſſinate the general, and ſeduce his troops. Young *Plut. in vita Pomp.*

Pompey.

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Filial. Pompey being informed of this deſign a few hours before it was to be put in execution, placed a faithful guard round the prætorium; ſo that none of the conſpirators could come near it. He then watched all the motions of the camp, and endeavoured to appeaſe the fury of the ſoldiers, who hated the general his father, by ſuch acts of prudence as were worthy of the oldeſt commanders. However, ſome of the mutineers having forced open one of the gates of the camp, in order to deſert to Cinna, the general's ſon threw himſelf flat on his back in their way, crying out, that they ſhould not break their oath and deſert their commander, without treading his body to death. By this means he put a ſtop to their deſertion, and afterwards wrought ſo effectually upon them by his affecting ſpeeches and engaging carriage, that he reconciled them to his father.

4. Olympias, Alexander's own mother, was of ſuch an unhappy diſpoſition, that he would never allow her to have any concern in the affairs of the government. She
Q. Curtius. uſed frequently to make very ſevere complaints on that account; but he always ſubmitted to her ill-humour with great mildneſs and patience. Antipater, one of his friends, having one day written a long letter againſt her to the king then abſent, the latter, after reading it, replied, "Antipater does not know that one ſingle tear ſhed by a mother will obliterate ten thouſand ſuch letters as this." A behaviour like this, and ſuch an anſwer, ſhow at one and the ſame time, that Alexander was both an affectionate ſon and an able politician.

5. Epaminondas is univerſally acknowledged to have been one of the greateſt generals and one of the beſt men which Greece ever produced. Before him the city of Thebes was not diſtinguiſhed by any memorable action, and after him it was not famous for its virtues, but its misfortunes, till it ſunk into its original obſcurity; ſo that it ſaw its glory take birth and expire with this great man. The victory he obtained at Leuctra had drawn the eyes and admiration of all the neighbouring people upon Epaminondas, who looked upon him as the ſupport of Thebes, as the triumphant conqueror of Sparta, as the deliverer of Greece: in a word, as the greateſt man, and the moſt excellent captain, that ever was in the world. In the midſt of this univerſal applauſe, ſo capable of making the general of an army forget the man for the victor, Epaminondas, little ſenſible to ſo affecting and ſo deſerved a glory, "My joy (ſaid he) ariſes from my ſenſe of that which the news of my victory will give my father and my mother."

6. Among an incredible number of illuſtrious perſons who were falſely accuſed and put to death by Nero, was one Bareas Soranus; a man, as Tacitus informs us, of ſingular vigilance and juſtice in the diſcharge of his duty. During his confinement, his daughter Serviſia was apprehended and brought into the ſenate, and there arraigned. The crime laid to her charge was, that ſhe had turned into money all her ornaments and jewels, and the moſt valuable part of her dreſs, to defray the expence of conſulting magicians. To this the young Serviſia, with tears, replied, That ſhe had indeed conſulted magicians, but the whole of her inquiry was to know whether the emperor and ſenate would afford protection and ſafety to her dear and indulgent parent againſt his accuſers. "With this view (ſaid ſhe) I preſented the diviners, men till now utterly unknown to me, with my jewels, apparel, and the other ornaments peculiar to my quality, as I would have preſented my blood and life, could my blood and life have procured my father's liberty. But whatever this my proceeding was, my unfortunate father was an utter ſtranger to it; and if it is a crime, I alone am the delinquent." She was, however, together with her father, condemned to die; but in what manner, hiſtory is ſilent. [Vid. *Taciti Annales*, lib. 6. cap. 20.] Filial Piety of Filices.

7. Valerius Maximus* likewiſe relates a very ſingular fact upon this ſubject. A woman of illuſtrious birth had been condemned to be ſtrangled. The Roman prætor delivered her up to the triumvir, who cauſed her to be carried to priſon, in order to her being put to death. The gaoler, who was ordered to execute her, was ſtruck with compaſſion, and could not reſolve to kill her. He choſe therefore to let her die of hunger. Beſides which, he ſuffered her daughter to ſee her in priſon; taking care, however, that ſhe brought her nothing to eat. As this continued many days, he was ſurpriſed that the priſoner lived ſo long without eating; and ſuſpecting the daughter, upon watching her, he diſcovered that ſhe nouriſhed her mother with her own milk. Amazed at ſo pious, and at the ſame time ſo ingenious an invention, he told the fact to the triumvir, and the triumvir to the prætor, who believed the thing merited relating in the aſſembly of the people. The criminal was pardoned, and a decree was paſſed that the mother and daughter ſhould be ſubſiſted for the reſt of their lives at the expence of the public. * Lib. v. 4. *Plinii Hiſt.* lib. vii. 36.

The ſame author gives a ſimilar inſtance of filial piety in a young woman named Xantippe to her aged father Cimonus, who was likewiſe confined in priſon, and which is univerſally known by the name of the *Roman Charity*. Both theſe inſtances appeared ſo very extraordinary and uncommon to that people, that they could only account for them, by ſuppoſing that the love of children to their parents was the firſt law of nature. *Putaret aliquis* (ſays our author) *hoc contrà naturam factum eſſe, niſi prima naturæ lex eſſet diligere parentes.*

In addition to the foregoing examples, we may refer to the article ETNA, n° 51. par. 3. where a very noble inſtance of filial piety is taken notice of. See alſo the article PIETAS.

FILIBEG, or FILLEBEG. See FILLEBEG.

FILICACIA (Vincent), a celebrated Italian poet, was born at Florence in 1642. He was a member of the Academy della Cruſca and of that of the Arcadi, and became ſecretary to the duke of Tuſcany. He died in 1707. His poems are much eſteemed for the delicacy and nobleneſs of their ſentiments. Scipio de Filicacia, his ſon, had them all printed together, under the title of *Poeſie Foſiano di Vitiçenzo da Filicacia*, in 1707, 4to.

FILICES, (from *filum* "a thread," *quaſi filatim inciſa*), FERNS; one of the ſeven tribes or families of the vegetable kingdom, according to Linnæus, by whom it is thus characterized: "having their fructification on the back ſide of the frondes." They conſtitute the firſt order in the claſs cryptogamia; and conſiſt of

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Filices ‖ Filagree.

16 genera, which are divided into *fructificationes, spicatæ, frondosæ, & radicales.* This order comprehends the entire xvith class of Tournefort, in whose system the filices make only a single genus, in the first section of the above mentioned class.

FILICES, is also an order of plants in the *fragmenta methodi naturalis* of Linnæus. See BOTANY, p. 469. col. 2.

FILIGRANE, FILIGREE, or FILLAGREE, *Work.* See FILLAGREE.

FILING, one of the principal operations in smithery, &c. succeeding to forging. See FILE.

The coarser cut files are always to be succeeded by finer; and in all the kinds the rule is, to lean heavy on the file in thrusting it forward, because the teeth of the file are made to cut forwards. But in drawing the file back again for a second stroke, it is to be lightly lifted just above the work, by reason its cuts not coming back.

The rough or coarse-toothed file (which, when large, is called a *rubber*) serves to take off the unevennesses of the work left by the hammer in forging.

The bastard-toothed file is to take out too deep cuts, and file strokes made by the rough file. The fine-toothed file takes out the cuts or file-strokes the bastard file made; and the smooth file those left by the fine file.

In this order, the files of several cuts are to succeed each other till the work is as smooth as it can be filed. After which it may be made yet smoother with emery, tripoli, &c. See POLISHING.

FILIPENDULA, in botany. See SPIRÆA.

FILIX, in botany. See FILICES.

FILLAGREE, FILIGREE, or FILIGRANE, *work*, a kind of enrichment on gold or silver, wrought delicately, in manner of little threads or grains, or both intermixed. The word is compounded of *fil* or *filum* "thread," and *granum* "grain." In Latin it is called *filatim elaboratum opus, argentum, aurum.*

There is no manufacture in any part of the world, that has been more admired and celebrated, than the fine gold and silver fillagree of Sumatra. And what renders it a matter of greater curiosity is the coarseness of the tools employed in the workmanship, and which, in the hands of an European, would not be thought sufficiently perfect for the most ordinary purposes.—They are rudely and inartificially formed, by the goldsmith (*pandi*), from any old iron he can pick up. When you engage one of them to execute a piece of work, his first request is usually for a piece of iron hoop, to make his wire-drawing instrument; an old hammer head, stuck in a block, serves for an anvil; and a pair of compasses is often composed of two old nails tied together at one end. The gold is melted in a piece of a *pretso* or earthen rice-pot, or sometimes in a crucible of their own make, of ordinary clay. In general they use no bellows, but blow the fire with their mouths, through a joint of bamboo; and if the quantity of metal to be melted is considerable, three or four persons sit round their furnace, which is an old broken quallee or iron pot, and blow together. At Padang alone, where the manufacture is more considerable, they have adopted the Chinese bellows. Their method of drawing the wire differs but little from that used by European workmen. When drawn to a sufficient fineness, they flatten it by beating it on their anvil; and when flattened, they give it a twist like that in the whalebone handle of a punch-ladle, by rubbing it on a block of wood with a flat stick. After twisting they again beat it on the anvil, and by these means it becomes flat wire with indented edges. With a pair of nippers they fold down the end of the wire, and thus form a leaf, or element of a flower in their work, which is cut off. The end is again folded and cut off, till they have got a sufficient number of leaves, which are all laid on singly. Patterns of the flowers or foliage, in which there is not very much variety, are prepared on paper, of the size of the gold plate on which the fillagree is to be laid. According to this, they begin to dispose on the plate the larger compartments of the foliage, for which they use plain flat wire of a larger size, and fill them up with the leaves before mentioned. To fix the work, they employ a glutinous substance, made of the red hot berry called *boca sago*, ground to a pulp on a rough stone. This pulp they place on a young cocoa-nut about the size of a walnut, the top and bottom being cut off. After the leaves have been all placed in order, and stuck on, bit by bit, a solder is prepared of gold-filings and borax, moistened with water, which they strew over the plate; and then putting it in the fire for a short time, the whole becomes united. This kind of work on a gold plate, they call *carrang papan*: when the work is open, they call it *carrang trouse.* In executing the latter, the foliage is laid out on a card, or soft kind of wood, and stuck on, as before described, with the sago berry; and the work, when finished, being strewed over with their solder, is put into the fire, when the card or soft wood burning away, the gold remains connected. If the piece be large, they solder it at several times. In the manufacture of badjoo buttons, they first make the lower part flat, and having a mould formed of a piece of buffalo's horn, indented to several sizes, each like one half of a bullet mould, they lay their work over one of these holes, and with a horn punch they press it into the form of the button. After this they complete the upper part. When the fillagree is finished, they cleanse it, by boiling it in water with common salt and alum, or sometimes lime juice; and in order to give it that fine purple colour which they call *sapo*, they boil it in water with brimstone. The manner of making the little balls with which their works are sometimes ornamented, is as follows. They take a piece of charcoal, and having cut it flat and smooth, they make in it a small hole, which they fill with gold dust, and this melted in the fire becomes a little ball. They are very inexpert at finishing and polishing the plain parts, hinges, screws, and the like, being in this as much excelled by the European artists, as these fall short of them in the fineness and minuteness of the foliage. The Chinese also make fillagree mostly of silver, which looks elegant, but wants likewise the extraordinary delicacy of the Malay work. The price of the workmanship depends upon the difficulty or uncommonness of the pattern. In some articles of usual demand, it does not exceed one third of the value of the gold; but in matters of fancy, it is generally equal to it.

Marsden's Account of Sumatra, p. 141.

Fillagree, Fillet.

FILLET, or FILET, in architecture, denotes a little

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Fillet || Filter.

little ſquare member or ornament uſed in divers places and on divers occaſions, but generally as a ſort of corona over a greater moulding.

The fillet is the ſame with what the French call *reglet*, *bande*, and *bandelette*; the Italians *liſta* or *liſtella*.

FILLET, in heraldry, a kind of orle or bordure, containing only a third or fourth part of the breadth of the common bordure. It is ſuppoſed to be withdrawn inwards, and is of a different colour from the field. It runs quite round, near the edge, as a lace over a cloak.

FILLET is alſo uſed for an ordinary drawn like the bar from the ſiniſter point of the chief acroſs the ſhield, in manner of a ſcarf; though it is ſometimes alſo ſeen in the ſituation of a bend, feſſe, croſs, &c.

According to Guillim, the fillet is a fourth part of the chief, and is placed in the chief point of the eſcutcheon.

FILLET is alſo uſed among painters, gilders, &c. for a little rule or reglet of leaf-gold, drawn over certain mouldings; or on the edges of frames, pannels, &c. eſpecially when painted white, by way of enrichment.

FILLETS, in the manege, are the loins of a horſe, which begin at the place where the hinder-part of the ſaddle reſts.

FILLY, a term among horſe-dealers, to denote the female or mare colt.

FILM, a thin ſkin or pellicle. In plants, it is uſed for that thin, woody ſkin, which ſeparates the ſeeds in the pods, and keeps them apart.

FILTER, or FILTRE, in chemiſtry, &c. a piece of woollen cloth, linen, paper, or other matter, ſome of which are in the form of hollow inverted cones, uſed to filtrate or ſtrain liquors through. The filtre has the ſame uſe and effect with regard to liquids that the ſieve or ſearce has in dry matters.

Filters are of two ſorts. The firſt are ſimple pieces of paper or cloth, through which the liquor is paſſed without farther trouble. The ſecond are twiſted up like a ſkain or wick, and firſt wetted, then ſqueezed, and one end put in the veſſel that contains the liquor to be filtrated; the other end is to be out, and hang down below the ſurface of the liquor; by means hereof the pureſt part of the liquor diſtils drop by drop out of the veſſel, leaving the coarſer part behind. This filter acts as a ſiphon.

FILTER is alſo a charm, ſuppoſed to have a virtue of inſpiring love. The word is derived from φιλτρον, which ſignifies the ſame thing, of φιλεω, *amo* "I love."

The Greeks, when their love was without ſucceſs, had ſeveral arts to procure the affections of their beloved. The Theſſalian women were famous for their ſkill in this as well as other magical practices. The means whereby it was effected were of divers ſorts; it was ſometimes done by potions called φιλτρα, which are frequently mentioned in authors of both languages. Juvenal ſpeaks thus:

Hic magicus affert cantus, hic Theſſala vendit
Philtra, *quibus valeant mentem vexare mariti.*

Their operations were violent and dangerous, and commonly deprived ſuch as drank them of their reaſon. Plutarch and Cornelius Nepos report, that Lucullus the Roman general firſt loſt his reaſon, and afterwards his life, by one of them. Lucretius the poet ended his life by the ſame way; and Caius Caligula, as Suetonius reports, was driven into a fit of madneſs by a filter given him by his wife Cæſonia, which ſtory is mentioned by the ſame poet. Ovid likewiſe aſſures us, that this was the uſual effect of ſuch potions. Filtration || Finch.

The ingredients they were made of were of various ſorts; ſeveral of which applied by themſelves were thought effectual.

FILTRATION, the act of paſſing any liquor through a filtre, called alſo *colature*, *percolation*, and *tranſcolation*. See FILTER, and CHEMISTRY, n° 568.

FIMBRIÆ, *Fringes*. The extremities or borders of the tubæ Fallopianæ were formerly thus called; the word ſignifying a *fringed border*, which that part reſembles.

FIMBRIATED, in heraldry, an ordinary with a narrow border or hem of another tincture.

FIN, in natural hiſtory, a well-known part of fiſhes, conſiſting of a membrane ſupported by rays, or little bony or cartilaginous oſſicles.

The office of the fins has commonly been ſuppoſed to be analogous to that of feathers in fowls; and to aſſiſt the fiſh in its progreſſive motion, or ſwimming: but the later naturaliſts find this a miſtake.

The tail is the great inſtrument of ſwimming: the fins only ſerve to keep the fiſh upright, and prevent vacillation or wavering. See ICHTHYOLOGY.

FINAL, in general, whatever terminates or concludes a thing; as *final* judgment, *final* ſentence, &c.

FINAL Cauſe, is the end for which the thing is done. The final cauſe is the firſt thing in the intention of a perſon who does a thing; and the laſt in the execution. See CAUSE.

FINAL Letters, among the Hebrew grammarians, five letters ſo called, becauſe they have a different figure at the end of words from what they have in any other ſituation.

FINAL, in geography, a port-town of Italy, ſubject to Genoa, and ſituated on the Mediterranean, about 37 miles ſouth-weſt of that city. It was ſold to the Genoeſe in 1713, by the emperor Charles VI. E. Long. 9. 12. N. Lat. 44. 30.

FINANCES, in the French policy, denote the revenues of the king and ſtate: much the ſame with the treaſury or exchequer of the Engliſh, and the fiſcus of the Romans.—The word is derived from the German *finantz*, "ſcraping, uſury." Though Du Cange chooſes rather to deduce it from the barbarous Latin *financia*, *præſtatio pecuniaria*.

Council of the FINANCES, correſponds to our lords-commiſſioners of the treaſury: the comptroller-general of the *finances*, to our lord high treaſurer, &c.

The French have a peculiar kind of figures, or numeral character, which they call *chiffre de finance*.

FINCH-KIND, in ornithology, an appellation given to a genus of birds known among authors by the name of FRINGILLA. See that article.

FINCH (Heneage), earl of Nottingham, the ſon of Sir Heneage Finch, ſome time recorder of London, and of a younger branch of the Winchelſea family, was born in 1621. By his good parts and diligence, he became a noted proficient in the municipal laws; was made ſolicitor-general by Charles II. on his reſtoration, and was very active in the proſecution of the regicides. In 1670, he was appointed attorney-general; about three years after, lord keeper of the great ſeal, on the removal of the earl of Shafteſbury; and lord chancellor in 1675. He was created earl of Not-

tingham

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Fine. tingham in 1681; and died the year following, being quite worn out by the fatigues of buſineſs. He publiſhed ſeveral ſpeeches on the trials of the judges of king Charles I. with ſome few other things; and left behind him Chancery Reports in MS.

FINE, that which is pure and without mixture. The term is particularly uſed in ſpeaking of gold or ſilver.

FINE, in law, hath divers applications. Sometimes it is uſed for a formal conveyance of lands or tenements, or of any thing inheritable, being *in eſſe temporis finis*, in order to cut off all controverſies. Others define it to be a final agreement between perſons, concerning any lands or rents, &c. of which any ſuit or writ is depending between them in any court.

FINE, ſometimes ſignifies a ſum of money paid for entering lands or tenements let by leaſe; and ſometimes a pecuniary mulct for an offence committed againſt the king and his laws, or againſt the lord of the manor.

Blackſt. Comment. *FINES for Alienation*, in feodal law. One of the attendants or conſequences of tenure by vaſſalſhip. *KNIGHT-Service*, was that of fines due to the lord for every alienation, whenever the tenant had occaſion to make over his land to another. This depended on the nature of the feodal connection; it not being reaſonable nor allowed, that a feudatory ſhould transfer his lord's gift to another, and ſubſtitute a new tenant to do the ſervice in his own ſtead, without the conſent of the lord: and, as the feodal obligation was conſidered as reciprocal, the lord alſo could not alienate his ſeignory without the conſent of his tenant, which conſent of his was called an *attornment*. This reſtraint upon the lord ſoon wore away; that upon the tenant continued longer. For, when every thing came in proceſs of time to be bought and ſold, the lords would not grant a licence to their tenants to aliene, without a fine being paid; apprehending that, if it was reaſonable for the heir to pay a fine or relief on the renovation of his paternal eſtate, it was much more reaſonable that a ſtranger ſhould make the ſame acknowledgment on his admiſſion to a newly purchaſed feud. In England, theſe fines ſeem only to have been exacted from the king's tenants *in capite*, who were never able to aliene without a licence: but as to common perſons, they were at liberty, by *magna charta*, and the ſtatute of *quia emptores* (if not earlier), to aliene the whole of their eſtate, to be holden of the ſame lord as they themſelves held it of before. But the king's tenants *in capite*, not being included under the general words of theſe ſtatutes, could not aliene without a licence: for if they did, it was in ancient ſtrictneſs an abſolute forfeiture of the land; though ſome have imagined otherwiſe. But this ſeverity was mitigated by the ſtatute 1 Edw. III. c. 12. which ordained, that in ſuch caſe the lands ſhould not be forfeited, but a reaſonable fine be paid to the king. Upon which ſtatute it was ſettled, that one-third of the yearly value ſhould be paid for a licence of alienation; but, if the tenant preſumed to aliene without a licence, a full year's value ſhould be paid. Theſe fines were at laſt totally taken away by ſtatute 12 Car. II. c. 24. See *KNIGHT-Service*.

FINE-Drawing, or *Reatering*, a dexterous ſewing up or rejoining the parts of any cloth, ſtuff, or the like, torn or rent in the dreſſing, wearing, &c.

Fine Fingal. It is prohibited to *fine draw* pieces of foreign manufacture upon thoſe of our own, as has formerly been practiſed. See REENTERING.

FINE-Stiller, in the diſtillery. That branch of the art which is employed on the diſtilling the ſpirit from treacle or other preparations or recrements of ſugar, is called *fine-ſtilling*, by way of diſtinction from malt-ſtilling; and the perſon who exerciſes this part of the trade is called a *fine-ſtiller*.

The operation in procuring the ſpirit from ſugar is the ſame with that uſed in making the malt-ſpirit; a waſh of the ſaccharine matter being made with water from treacle, &c. and fermented with yeaſt. It is uſual to add in this caſe, however, a conſiderable portion of malt, and ſometimes powdered jalap, to the fermenting backs. The malt accelerates the fermentation, and makes the ſpirit come out the cheaper, and the jalap prevents the riſe of any muſty head on the ſurface of the fermenting liquor, ſo as to leave a greater opportunity for the free acceſs of the air, and thus to ſhorten the work, by turning the foamy into a hiſſing fermentation.

FINERS *of* GOLD *and* SILVER, are thoſe who purify and part thoſe metals from other coarſer ones by fire and acids. They are alſo called *parters* in our old law-books, and ſometimes *departers*.

FINERY, in the iron-works, is one of the two forges at which they hammer the ſow or pig iron.

Into the finery they firſt put the pigs of iron, placing three or four of them together behind the fire, with a little of one end thruſt into it; where, ſoftening by degrees, they ſtir and work them with long bars of iron, and expoſe at different times different parts to the blaſt of the bellows, in order to refine it as equally as poſſible, till the metal runs together with a round maſs or lump, which they call a *half bloom*. They then take this out, and give it a few ſtrokes with their ſledges; afterwards they carry it to a great heavy hammer, raiſed by the motion of a water-wheel; where, applying it dexterouſly to the blows, they preſently beat it out into a thick ſhort ſquare. This they put into the finery again, and heating it red-hot, they work it under the ſame hammer till it comes to be in the ſhape of a bar in the middle, but with two ſquare knobs at the ends, which they call an *ancony*. It is then carried into the other forge called the *chaffry*.

FINEERING. See VENEERING.

FINESSE, a French term, of late current in Engliſh. Literally, it is of no farther import than our Engliſh *fineneſs*; but among us it is chiefly uſed to denote that peculiar delicacy or ſubtilty perceived in works of the mind, and the niceſt and moſt ſecret and ſublime parts of any ſcience or art.

It is ſometimes uſed to expreſs that kind of ſubtilty made uſe of for the purpoſes of deception.

FINGAL, king of Morven, in ancient Caledonia. He flouriſhed in the third century; and according to the Iriſh hiſtories died in the year 283, although there is ſome reaſon from Oſſian's poems for placing his death a few years later. Fingal was deſcended in all probability from thoſe Celtic tribes who were the firſt inhabitants of Britain. Tradition, and the poems of Oſſian,

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Fingal. Oſſian, give him a long line of royal anceſtors, ſuch as Combal, Trenmor, Trathal, &c. who had all reigned over the ſame territory. Whether this territory was bounded by the Caledonian foreſt, or extended ſomewhat farther to the ſouth, towards the Roman province, is uncertain; but there is no doubt of its having extended over all the north and weſt Highlands, comprehending the Hebrides, whoſe petty chiefs were all ſubject to the king of Morven. His principal place of reſidence was Selma, which was probably in the neighbourhood of Glenco, ſuppoſed to be the Cona of Oſſian; though ſome imagine it to have been in Strath-Conan in Moray. The truth ſeems to be, that as Fingal and his people lived by hunting, they often ſhifted their habitation. Hence, in all parts of the Highlands we find, in the names of places, buildings, &c. ſuch monuments as juſtify their ſeveral claims for the honour of Fingal's reſidence. Fingal acquired great fame by his proweſs in arms. He made many ſucceſsful incurſions into the Roman province, from whence he carried away thoſe ſpoils which his ſon ſo often mentions under the names of the *wine of the ſtranger*, and the *wax of the ſtranger*. By ſea we find him frequently making voyages to Scandinavia, the Orkneys, and Ireland; called by Oſſian *Lochlin*, *Inniſtore*, and *Ullin*. Several of theſe expeditions were celebrated by his ſon in epic poems, of which two only remain, Fingal and Temora. In the laſt of theſe poems, we find Fingal fighting together with his grandſon Oſcar. How long he lived afterwards is uncertain. He is ſaid to have died a natural death; and therefore none of his ſon's poems relate to this event, though it is occaſionally mentioned in many of them. "Did thy beauty laſt, O Ryno? Stood the ſtrength of car-borne Oſcar? Fingal himſelf paſſed away; and the halls of his fathers have forgot his ſteps. The blaſt of the north opens thy gates, O king, and I behold thee ſitting on miſt, dimly gleaming in all thine arms. Thy form now is not the terror of the valiant: but like a watery cloud, when we ſee the ſtars behind it, with their weeping eyes. Thy ſhield is like the aged moon; thy ſword vapour half kindled with fire. Dim and feeble is the chief who travelled in brightneſs before—But thy ſteps are on the winds of the deſert, and the ſtorms darken in thy hand. Thou takeſt the ſun in thy wrath, and hideſt him in thy clouds. The ſons of little men are afraid, and a thouſand ſhowers deſcend."—*Berrathon*.

"The character of Fingal (Dr Blair obſerves) is perhaps the moſt perfect that was ever drawn by a poet, for we may boldly defy all the writers of antiquity to ſhow us any hero equal to Fingal. Throughout the whole of Oſſian's works, he is preſented to us in all that variety of lights which give the full diſplay of a character. In him concur almoſt all the qualities that can ennoble human nature; that can either make us admire the hero, or love the man. He is not only unconquerable in war, but he makes his people happy by his wiſdom in the days of peace. He is truly the father of his people. He is known by the epithet of 'Fingal of the mildeſt look,' and diſtinguiſhed on every occaſion by humanity and generoſity. He is merciful to his foes, full of affection to his children, full of concern about his friends, and never mentions Agandecca, his firſt love, without the utmoſt tenderneſs. He is the univerſal protector of the diſtreſſed; none ever went ſad from Fingal.—'O Oſcar! bend the ſtrong in arms, but ſpare the feeble hand. Be thou a ſtream of many tides againſt the foes of thy people; but like the gale that moves the graſs to thoſe who aſk thine aid: ſo Trenmor lived; ſuch Trathal was; and ſuch has Fingal been. My arm was the ſupport of the injured; the weak reſted behind the lightning of my ſteel.' Theſe were the maxims of true heroiſm, to which he formed his grandſon. His fame is repreſented as every where ſpread; the greateſt heroes acknowledge his ſuperiority; his enemies tremble at his name; and the higheſt encomiums that can be beſtowed on one whom the poet would moſt exalt, is to ſay, That his ſoul was like the ſoul of Fingal. Wherever he appears, we behold the hero. The objects he purſues are always great; to bend the proud, to protect the injured, to defend his friends, to overcome his enemies by generoſity more than by force. Some ſtrokes of human imperfection and frailty are what uſually give us the moſt clear view and the moſt ſenſible impreſſion of a character, becauſe they preſent to us a man ſuch as we have ſeen; they recal known features of human nature. When poets go beyond this range, and attempt to deſcribe a faultleſs hero, they, for the moſt part, ſet before us a ſort of vague undiſtinguiſhable character, ſuch as the imagination cannot lay hold of, or realiſe to itſelf as the object of affection. But Fingal, though exhibited without any of the common human failings, is nevertheleſs a real man; a character which touches and intereſts every reader."

We may obſerve, that Fingal appears to have been no leſs a poet than a warrior; at leaſt, in all thoſe paſſages aſcribed to him in the poems of his ſon, there is a grandeur and loftineſs that elevates them above the common ſtyle even of Oſſian. The following paſſage from the poem of *Carthon* may be taken as a ſpecimen of Fingal's poetry. "—'Raiſe, ye bards,' ſaid the mighty Fingal, 'the praiſe of unhappy Moina. Call her ghoſt, with your ſongs, to our hills; that ſhe may reſt with the fair of Morven, the ſunbeams of other days, and the delight of heroes of old.—I have ſeen the walls of Balclutha, but they were deſolate. The fire had reſounded in the halls; and the voice of the people is heard no more. The ſtream of Clutha was removed from its place by the fall of the walls. The thiſtle ſhook, there, its lonely head: the moſs whiſtled to the wind. The fox looked out from the windows; the rank graſs of the wall waved round his head. Deſolate is the dwelling of Moina: ſilence is in the houſe of her fathers. Raiſe the ſong of mourning, O bards, over the land of ſtrangers. They have but fallen before us; for, one day we muſt fall.—Why doſt thou build the hall, ſon of the winged days? Thou lookeſt from thy towers to-day; yet a few years, and the blaſt of the deſart comes; it howls in thy empty court, and whiſtles round thy half-worn ſhield.—And let the blaſt of the deſart come! We ſhall be renowned in our day. The mark of my arm ſhall be in the battle, and my name in the ſong of bards. Raiſe the ſong; ſend round the ſhell: and let joy be heard in my hall. When thou, ſun of heaven, ſhalt fail? if thou ſhalt fail, thou mighty light! if thy brightneſs is for a ſeaſon, like Fingal; our fame ſhall ſurvive thy beams.'—Such was the

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Fingers Fire.

the joy of Fingal in the day of his joy. His thouſand bards leaned forward from their ſeats, to hear the voice of the king. It was like the muſic of the harp on the gale of the ſpring. Lovely were thy thoughts, O Fingal! Why had not Oſſian the ſtrength of thy ſoul? But thou ſtandeſt alone, my father; and who can equal the king of Morven?"

FINGERS, in anatomy, the extreme part of the hand divided into five members. See ANATOMY, n° 56.

FINING *of* LIQUORS. See CLARIFICATION.

FINISTERRE, the moſt weſterly cape or promontory of Spain, in 10. 15. W. Long. and 43° N. Lat. This cape is likewiſe the moſt weſterly part of the continent of Europe.

FINITE, ſomething bounded or limited, in contradiſtinction to INFINITE.

FINLAND (the duchy of), is bounded on the weſt by the gulph of Bothnia, on the eaſt by Muſcovy, on the ſouth by the gulph of Finland and Ingria, and on the north by Bothnia and Lapland. It is about 200 miles in length, and almoſt as much in breadth. It contains many lakes; in which are ſeveral iſlands, which are generally rocks or inacceſſible mountains. The inhabitants are ſmall of ſtature, capable of enduring hardſhips, and good ſoldiers. The Ruſſians have for ſome time rendered themſelves maſters of a good part of this province; the reſt belongs to Sweden. It is divided into ſeven provinces: 1. Finland; 2. Cajana; 3. Thavaſthia; 4. Nyeland; 5. Savolaxia; 6. Carelia; and, 7. Kexholmia.

Finland Proper is an agreeable country, and lies over-againſt the city of Stockholm, near the place where the gulphs of Bothnia and Finland meet. It is divided into South and North Finland. It is diverſified with mountains, foreſts, lakes, meadows, and pleaſant fields. The inhabitants ſalt the fiſh they do not conſume themſelves, and ſend it into foreign countries.

FINNINGIA, or FENNINGIA, (anc. geog.), the true reading for *Eningia* in Pliny, which he makes an iſland, but is more truly a peninſula. Now FINLAND, a province of Sweden. *Fenni*, or *Finni*, the people; whoſe ferocity was extraordinary, poverty extreme, herbs their food, ſkins their covering, and the ground their couch: regardleſs of man and of gods, they attained to a very difficult thing, not to have a ſingle wiſh to form, (Tacitus.)

FIR-TREE, in botany. See PINUS.

FIRE, in phyſiology, ſignifies that ſubtile inviſible cauſe by which bodies are expanded or enlarged in bulk, and become hot to the touch; fluids are rarefied into vapour; ſolid bodies become fluid, and in like manner are at laſt diſſipated, or if incapable of being carried off in vapour are at length melted into glaſs. It ſeems likewiſe to be the chief agent in nature on which animal and vegetable life have an immediate dependence, and without which it does not appear that nature itſelf could ſubſiſt a ſingle moment.

The diſputes concerning fire, which for a long time divided philoſophers, have now in a great meaſure, though not wholly, ſubſided. The celebrated philoſophers of the laſt century, Bacon, Boyle, and Newton, were of opinion, that fire was no diſtinct ſubſtance from other bodies, but that it conſiſted entirely in the violent motion of the parts of any body. As no motion, however, can be produced without a cauſe, they were obliged to have recourſe to a mechanical force or impulſe as the ultimate cauſe of fire in all caſes. Thus Boyle tells us, that when a piece of iron becomes hot by hammering, "there is *nothing* to make it ſo, except the forcible motion of the hammer impreſſing a vehement and variouſly determined agitation on the ſmall parts of the iron." Bacon defines *heat*, which he makes ſynonymous with fire, to be "an expanſive undulatory motion in the minute particles of a body, whereby they tend with ſome rapidity from a centre towards a circumference, and at the ſame time a little upwards." Sir Iſaac Newton ſaid nothing poſitive upon the ſubject; but conjectured that groſs bodies and light might be convertible into one another; and that great bodies of the ſize of our earth when violently heated, might continue and increaſe their heat by the mutual action and reaction of their parts. Fire.

But while the mechanical philoſophers thus endeavoured to account for the phenomena of fire upon the ſame principles which they judged ſufficient to explain thoſe of the univerſe in general, the chemiſts as ſtrenuouſly aſſerted that fire was a fluid of a certain kind, diſtinct from all others, and univerſally preſent throughout the whole globe. Boerhaave particularly maintained this doctrine; and in ſupport of it brought the following argument, that ſteel and flint would ſtrike fire, and produce the very ſame degree of heat in Nova Zembla which they would do under the equator. Other arguments were drawn from the increaſed weight of metalline calces, which they ſuppoſed to proceed from the fixing of the element of fire in the ſubſtance whoſe weight was thus increaſed. By theſe experiments Mr Boyle himſelf ſeems to have been ſtaggered; as he publiſhed a treatiſe on the poſſibility of making fire and flame ponderable; though this was directly contrary to his own principles already quoted. For a long time, however, the matter was moſt violently diſputed; and the mechanical philoſophers, though their arguments were equally inconcluſive with thoſe of their adverſaries, at laſt prevailed through the prejudice in favour of Sir Iſaac Newton, who indeed had ſcarce taken any active part in the conteſt.

That the cauſe of fire cannot be any mechanical motion which we can impreſs, is very evident; becauſe on mechanical principles an effect muſt always be proportionable to the cauſe. In the caſe of fire, however, the effect is beyond all calculation greater than the cauſe, ſuppoſing the latter to be only a mechanical percuſſion, as in the caſe of hammering iron till it be red hot. By a few ſtrokes of an hammer, the particles of a piece of iron, we ſhall allow, may be ſet in a violent motion, and thus produce fire. If, however, we direct the motion of theſe particles upon another body whoſe parts are at reſt, and in ſome degree coherent, it is plain that the latter will reſiſt and diminiſh the motion of the particles already moved, in proportion to their *vis inertiæ*, as well as the cohefion of the parts of the ſecond body, if indeed we can ſuppoſe the *vis inertiæ* of matter to be different from the effect of gravitation, cohefion, or ſome other power acting upon it. By no argumentation whatever, then, can we ſhow upon mechanical principles, why fire ſhould have ſuch a tendency to increaſe and multiply itſelf without end, as we ſee it has, even abſtracting from all conſideration of the neceſſity of air for continuing the action of fire.

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Fire. The action of the air in augmenting and continuing the power of fire, ſeems ſcarce at all to have been conſidered by thoſe who firſt undertook an inveſtigation of the ſubject. It evidently gave riſe to the Hutchinſonian hypotheſis, that fire, light, and air, were convertible into one another. This, however, is equally untenible with the mechanical hypotheſis: for later diſcoveries have ſhown, that our atmoſphere is compoſed of two diſtinct fluids, only one of which is fit for ſupporting flame; and if we ſhould ſuppoſe this to be the only proper air, it is in like manner demonſtrated, that this pure fluid is not homogeneous, but compoſed of a gravitating and non-gravitating ſubſtance; the latter of which only has the properties of fire: ſo that this element is ſtill as inviſible as ever; nor can it be ſhown by any experiment that *fire per ſe* has ever been changed into a palpable or gravitating ſubſtance.

The experiments which firſt ſeemed to bring this diſpute to a deciſion were thoſe of Dr Black, concerning what he called *latent heat*; on which ſome other names, ſuch as *abſolute heat*, *ſpecific fire*, &c. have been beſtowed, very little to the advancement of ſcience in general. From theſe diſcoveries it appears, that fire may exiſt in bodies in ſuch a manner as not to diſcover itſelf in any other way than by its action upon the minute parts of the body; but that ſuddenly this action may be changed in ſuch a manner as no longer to be directed upon the particles of the body itſelf, but upon external objects: in which caſe we then perceive its action by our ſenſe of feeling, or diſcover it by the thermometer, and call it *ſenſible heat*. This expreſſion, it muſt be owned, is improper; and the uſe of the word *heat*, inſtead of *fire*, has produced ſome confuſion, which it is not now eaſy to avoid in ſpeaking on theſe ſubjects. By the word *heat*, we ought always to underſtand the effect of fire, or the fluid acting in a certain manner, rather than the mere element itſelf; which, it is certain, from the experiments juſt mentioned, may exiſt in ſubſtances actually *cold* to the touch.

From this diſcovery made by Dr Black, along with many others in electricity, and recorded at length in various articles of this work, it is now almoſt univerſally allowed, that fire is a diſtinct fluid capable of being transferred from one body to another. But when this was diſcovered, another queſtion no leſs perplexing occurred, viz. what kind of a fluid it was; or whether it bears any analogy to thoſe with which we are better acquainted? Here we find two fluids, viz. the ſolar light, and the electric matter, both of which occaſionally act as fire, and which therefore ſeem likely to be all the ſame at bottom. By the vulgar, indeed, the matter has long ago been determined; and the rays of the ſun as well as the electrical fluid have been promiſcuouſly denominated *elementary fire*. Philoſophers, indeed, have with-held their aſſent; though their reaſons for ſo doing are by no means apparent. The moſt ſtrange ſuppoſitions, however, have been made concerning the nature of both thoſe fluids, and on the moſt ſlender grounds imaginable; or rather, on no grounds at all, they have been ſuppoſed to be phlogiſton itſelf, or to contain a large proportion of it. Mr Scheele went ſo far in this way as to form an hypotheſis, which he endeavoured to ſupport by ſome experiments, that fire is compoſed of dephlogiſticated air and phlogiſton. But it is now aſcertained beyond all poſſibility of diſpute, that the reſult of ſuch a combination is not fire, but fixed air: ſo that we need not take any farther notice of this hypotheſis than juſt to obſerve, that it would have been altogether untenible, even though this diſcovery had not been made; becauſe the dephlogiſticated air itſelf is not a ſimple but a compound ſubſtance, as has already been obſerved; and that in all caſes of combuſtion the one part of the air is ſeparated from the other. Fire.

It was long ago obſerved by Sir Iſaac Newton, that heat was certainly conveyed by a medium more ſubtile than the common air; becauſe two thermometers, one included in the vacuum of an air-pump, the other placed in the open air, at an equal diſtance from the fire, would grow equally hot in nearly the ſame time. The conſequence of this, had he purſued the thought, was, that fire itſelf was equally preſent in all places, and as active where there was no terreſtrial matter as where there was. New improvements in the air-pump have enabled ſucceeding philoſophers to make more perfect vacuums, ſuch as it has been ſuppoſed even the electric matter cannot paſs through. It is not to be doubted, however, that, even there, the thermometer would be heated by a fire as well as in the open air. Fire, therefore, exiſts and acts where there is no other matter, and of conſequence is a fluid *per ſe*, independent of every terreſtrial ſubſtance, without being generated or compounded of any thing we are yet acquainted with. To determine the nature of the fluid, we have only to conſider whether any other can be diſcovered which will paſs through the perfect vacuum juſt mentioned, and act there as fire. Such a fluid we find in the ſolar light, which is well known to act even *in vacuo* as the moſt violent fire. The ſolar light will likewiſe act in the very ſame manner in the moſt intenſe cold; for M. de Sauſſure has found, that on the cold mountain top the ſun-beams are equally, nay more powerful, than on the plain below. It appears, therefore, that the ſolar light will produce heat independent of any other ſubſtance whatever; that is, where no other body is preſent, at leaſt as far as we can judge, except the light itſelf, and the body to be acted upon. We cannot therefore avoid concluding, that a certain modification of the light of the ſun is the cauſe which produces heat, expanſion, vapour, &c. and anſwers to the reſt of the characters given in our definition of fire, and that independent of any other ſubſtance whatever.

Under the article ELECTRICITY, Sect. vi. we have endeavoured to ſhow that the electric matter is no other than the light of the ſun abſorbed by the earth, and thus becoming ſubject to new laws, and aſſuming many properties apparently different from what it has when it acts as light. Even in this caſe it manifeſts its identity with fire or light, *viz.* by producing a moſt intenſe heat where a large quantity of it paſſes through a ſmall ſpace. *In vacuo*, indeed, we cannot manage it in ſuch a manner as to make the proof deciſive. But though this muſt be accounted a defect, it never can amount to any poſitive proof that electricity and fire are different. We ſee that in ſome caſes they produce the very ſame effects; and if they do not ſo in all, we ought rather to account for the difference from the variation of circumſtances, and our want of knowledge or abili-

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Fire. ties to make proper experiments, than to multiply elements without any neceſſity, when one is evidently capable of anſwering all the purpoſes of nature. At any rate, the experiments which have already been made, and the proofs adduced from the phenomena of nature, ſhow ſuch a ſtrong affinity between the elements of fire, light, and electricity, that we may not only aſſert their identity upon the moſt probable grounds, but lay it down as a poſition againſt which no argument of any weight has an exiſtence at preſent. For a further diſcuſſion of this ſubject, ſee CHEMISTRY, Part I. Sect. i. ELECTRICITY, Sect. vi. HEAT, FLAME, FLUIDITY, &c.

Wild Fire, a kind of artificial or factitious fire, which burns even under water, and that with greater violence than out of it.

It is compoſed of ſulphur, naphtha, pitch, gum, and bitumen; and is only extinguiſhable by vinegar mixed with ſand and urine, or by raw hides.

Its motion or tendency is ſaid to be contrary to that of natural fire, and always follows the direction in which it is thrown; whether it be downwards, ſidewiſe, or otherwiſe. The French call it *Greek fire*, or *feu Gregeois*, becauſe firſt uſed by the Greeks, about the year 660; as is obſerved by the Jeſuit Petavius, on the authority of Nicetas, Theophanes, Cedrenus, &c.

The inventor, according to the ſame Jeſuit, was an engineer of Heliopolis, in Syria, named *Callinicus*, who firſt applied it in the ſea-fight commanded by Conſtantine Pogonates againſt the Saracens, near Cyzicus, in the Helleſpont; and with ſuch effect, that he burnt the whole fleet therewith, wherein were 30,000 men. But others will have it of a much older date; and hold Marcus Gracchus the inventor: which opinion is ſupported by ſeveral paſſages both in the Greek and Roman writers, which ſhows it to have been anciently uſed by both theſe nations in their wars.

Conſtantine's ſucceſſors uſed it on divers occaſions with equal advantage as himſelf; and what is remarkable enough is, that they were ſo happy as to keep the ſecret of the compoſition to themſelves, ſo that no other nation knew it in the year 960.

Hugh king of Burgundy, demanding ſhips of the emperor Leo, for the ſiege of Freſne, deſired likewiſe the Greek fire.

F. Daniel gives us a good deſcription of the Greek fire in his account of the ſiege of Damietta under St Louis. Every body, ſays that author, was aſtoniſhed with the Greek fire, which the Turks then prepared; and the ſecret whereof is now loſt. They threw it out of a kind of mortar; and ſometimes ſhot it with an odd ſort of croſs-bow, which was ſtrongly bent by means of a handle or winch, of much greater force than the mere arm. That thrown with the mortar ſometimes appeared in the air of the ſize of a tun, with a long tail, and a noiſe like that of thunder. The French by degrees got the ſecret of extinguiſhing it; in which they ſucceeded ſeveral times.

Ann. Reg. xviii. 117. *Machine for Preſerving from Fire.* This machine conſiſts of a pole, a rope, and a baſket. The pole is of fir, or a common ſcaffold pole, of any convenient length from 36 to 46 feet; the diameter at bottom, or greateſt end, about five inches; and at the top, or ſmalleſt end, about three inches. At three feet from the top is a mortiſe through the pole, and a pully fixed to it of nearly the ſame diameter with the pole in that part. The rope is about three quarters of an inch diameter, and twice the length of the pole, with a ſpring hook at one end, to paſs through the ring in the handle of the baſket when uſed: it is put through the mortiſe over the pulley, and then drawn tight on each ſide to near the bottom of the pole, and made faſt there till wanted. The baſket ſhould be of ſtrong wicker-work, three feet and a half long, two feet and a half wide, rounded off at the corners, and four feet deep, rounding every way at the bottom. To the top of the baſket is fixed a ſtrong iron curve or handle, with an eye or ring in the middle; and to one ſide of the baſket, near the top, is fixed a ſmall cord, or guide-rope, of about the length of the pole. When the pole is raiſed, and ſet againſt a houſe over the window from which any perſons are to eſcape, the manner of uſing it is ſo plain and obvious, that it needs not be deſcribed. The moſt convenient diſtance from the houſe for the foot of the pole to ſtand, where practicable, is about 12 or 14 feet. If two ſtrong iron ſtraps, about three feet long, rivetted to a bar croſs, and ſpreading about 14 inches at the foot, were fixed at the bottom of the pole, this would prevent its turning round or ſlipping on the pavement. And if a ſtrong iron hoop, or ferule, rivetted (or welded) to a ſemicircular piece of iron ſpreading about 12 inches, and pointed at the ends, were fixed on at the top of the pole, it would prevent its ſliding againſt the wall. Fire.

When theſe two laſt mentioned irons are fixed on, they give the pole all the ſteadineſs of a ladder; and becauſe it is not eaſy, except to perſons who have been uſed to it, to raiſe and ſet upright a pole of 40 feet or more in length, it will be convenient to have two ſmall poles or ſpars of about two inches diameter, fixed to the ſides of the great pole at about two or three feet above the middle of it, by iron eyes rivetted to two plates, ſo as to turn every way; the lower end of theſe ſpars to reach within a foot of the botom of the great pole, and to have ferules and ſhort ſpikes to prevent ſliding on the pavement, when uſed occaſionally to ſupport the great pole like a tripod. There ſhould be two ſtrong aſh trundles let through the pole, one at four feet and one at five feet from the bottom, to ſtand out about eight inches on each ſide, and to ſerve as handles, or to twiſt the rope round in lowering a very heavy weight. If a block and pulley were fixed at about the middle of the rope, above the other pulley, and the other part of the rope made to run double, it would diminiſh any weight in the baſket nearly one-half, and be very uſeful in drawing any perſon up, to the aſſiſtance of thoſe in the chambers, or for removing any effects out of a chamber, which it might be dangerous to attempt by the ſtairs.

It has been proved, by repeated trials, that ſuch a pole as we have been ſpeaking of can be raiſed from the ground, and two or three perſons taken out of the upper windows of an houſe, and ſet down ſafely in the ſtreet, in the ſpace of 35 ſeconds, or a little more than half a minute. Sick and infirm perſons, women, children, and many others, who cannot make uſe of a ladder, may be ſafely and eaſily brought down from any of the windows of an houſe on fire by this machine, and, by putting a ſhort pole through the handles of the baſket, may be removed to any diſtance without being taken out of the baſket. The pole muſt always have the

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Fire. the rope ready fixed to it, and may be conveniently laid up upon two or three iron hooks under any ſhade or gate-way, and the baſket ſhould be kept at the watch-houſe. When the pole is laid up, the two ſpars ſhould always be turned towards the head of it. The baſket ſhould be made of peeled rods, and the pole and ſpars painted of a light ſtone-colour, to render it more viſible when uſed in the night.

Machines for extinguiſhing FIRE. In the year 1734, the ſtate of Sweden offered a premium of 20,000 crowns for the beſt method of ſtopping the progreſs of accidental fires; when one Mr Fuches, a German phyſician, made a preparation for that end, and the experiment was made on a houſe built on purpoſe, of dry fir, at Legard iſland. In the building were placed ſeveral tubs of tar and pitch, and a great quantity of chips, all which were ſet on fire; flames iſſuing through the top of the houſe, windows, &c. when he threw in one of the barrels containing the preparation, which immediately quenched the flames; a ſecond barrel entirely cleared the ſmoke away; and the whole was executed to the ſatisfaction of the ſpectators, and to the no ſmall ſatisfaction of the inventor, who was about to return home, when unexpectedly the flames broke out again, ſuppoſed to be occaſioned by a ſmall quantity of combuſtible matter being introduced and ſet on fire ſecretly by ſome malicious perſon. Upon this the wrong-headed mob fell upon Mr Fuches, and beat him moſt unmercifully, ſo that he narrowly eſcaped with his life. He ſoon after left the country, and never could be prevailed on (though ſtrongly perſuaded by ſome of the moſt eminent citizens) to return. It is ſaid, another experiment of the ſame kind was tried in the year 1761 in Holland; but rendered abortive through the perverſeneſs of the populace.

Attempts of a ſimilar nature have met with a better reception in England. Of theſe the moſt ſucceſsful was that of Mr Godfrey, whoſe contrivance is thus deſcribed by Mr Ambroſe Godfrey, grandſon to the inventor. "The machine to be employed conſiſts of a ſmall portion of gunpowder cloſely confined; which, when animated by fire, acts by its elaſtic force upon a proper medium, and not only divideth it into the minuteſt atoms, but diſperſeth it alſo in every direction, ſo as immediately to extinguiſh any fire within a certain diſtance. This medium is a liquor ſtrongly impregnated with a preparation of antiphlogiſtic principles, which by their action upon burning materials extinguiſh the flames, and reduce them in general to the ſtate of a black coal; and, by its oppoſite nature to fire, hinders the remaining ſparks, notwithſtanding the admiſſion of the air, from kindling the flames afreſh. By this means, the great point is obtained, in giving ſufficient time for totally extinguiſhing any remains of fire.

"They who preſume that water only will perform this will find themſelves greatly miſtaken, as the draught of air will certainly rekindle the neighbouring materials, which are very fit to receive a freſh flame, the fire not being extinguiſhed by the quantity of water, but rather by the expanſion and rarefaction of its particles. There are ſeveral ſizes of theſe machines, from five to fifty pounds weight, in a portable and rather ſmall compaſs, and may generally be carried to any place where a man can go himſelf.

"But though theſe machines will prevent great fires by a timely application, they will not extinguiſh them after they have reached a frightful height, and ſeveral houſes, perhaps near a whole ſtreet, are in flames. The floors muſt be ſtanding, and acceſs to the building ſafe, otherwiſe no perſon can be ſuppoſed to approach near enough to apply them in a proper manner. Every fire has its beginning for the moſt part in ſome apartment; and, as ſoon as diſcovered, the family, inſtead of loſing all preſence of mind, ſhould immediately apply one or more of theſe machines, which will then fully anſwer the intention. The proper time of applying them, ſuppoſes that they are ready at hand. It will be in vain to think of fetching them from any conſiderable diſtance, as it will then be too late for them to perform any important ſervice; except indeed being the probable means of ſaving ſome adjacent houſe, by extinguiſhing the flames as often as they break out, till the building firſt on fire is totally conſumed, and, by falling into ruins, leaves the other in perfect ſafety."

Fire.

On the 19th of May 1761, at noon, Mr Godfrey's experiment for extinguiſhing fire, was tried in an houſe erected for that purpoſe, near Mary-le-bon. Their royal highneſſes the duke of York, prince William Henry, prince Henry Frederic, a great number of perſons of rank and diſtinction, and many of the learned world, gave their attendance on this ſingular occaſion. The houſe, which is of brick, conſiſts of three rooms one above another, a ſtair-caſe, chimney, lath-and-plaſter ceilings, and a kind of wainſcotting round the rooms, of rough deal. Exactly at 12 o'clock the ground room, and that up one pair of ſtairs, were ſet on fire, by lighting the faggots and ſhavings laid in there for that purpoſe: in about 15 minutes the wainſcot of the under room was thought to be ſufficiently in flames, and three of the machines were thrown in; which, by almoſt immediate and ſudden exploſions, inſtantaneouſly extinguiſhed the flames, and the very ſmoke in that apartment in a few minutes totally diſappeared. By this time, the firemen, &c. who had the care of throwing in the machines, gave an alarm that the ſtair caſe had taken fire, and that it was neceſſary directly to go to work upon the next room; which was accordingly done, and with the ſame effect. The experiment, however, hitherto did not univerſally ſatisfy: in the laſt inſtance eſpecially it was thought to be too haſtily put in execution; and the populace without-ſide the paling, who were ſuppoſed to amount to near 20,000, and whoſe curioſity, from the very nature of their ſituation, remained much diſſatisfied, began to grow rather riotous, and talked of a ſecond bottle-conjuror. For the ſake of the experiment, therefore, and to remove all manner of doubt, Mr Godfrey conſented to a third experiment in the upper room, which was entirely of wood. The flames were now ſuffered to get to a conſiderable height, and even the window-frames deſtroyed, before the machines were thrown in: which, however, anſwered exactly as the former had done; and, being quite in ſight of the out-ſtanders, met with univerſal approbation.

Theſe machines of Mr Godfrey's, it is evident, would be of great uſe in extinguiſhing fires on ſhipboard; and might be conſidered as a no leſs neceſſary part of a ſhip's lading, than her ſtores or ammunition.

The hint of theſe machines is ſaid to have been taken by Dr Godfrey from the invention of one Zachary Greyl,

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Fire. Greyl, who exhibited machines ſimilar to thoſe of Dr Godfrey, before perſons of the firſt rank, but without meeting with any encouragement. His machines were made of wood, and the liquor employed was only water, and conſequently inferior to Dr Godfrey's in its power of extinguiſhing fire. The latter is ſaid to have mixed his water with a certain quantity of oil of vitriol, or with ſal ammoniac. Theſe machines, however, as already obſerved, are found to be only ſerviceable in the beginning of a fire. When the roof had fallen in, they had no effect.

Water-Engine for Extinguiſhing Fire. See Hydrostatics, n° 33.

In uſing this machine we have the following improvement by Dr Hoffman, which promiſes to be of great efficacy. As ſoon as the engine is in readineſs to work, ſtir into the water that immediately is to be diſcharged, ſeven or eight pounds of pearl-aſhes in powder, and continue to add it in this manner as occaſion requires; taking care that it be directed againſt the timber or wainſcot, &c. juſt beginning to burn, and not waſted againſt the brickwork: or, where time will admit, diſſolve any quantity of pearl-aſhes in a copper with water, and as faſt as it diſſolves, which will be in a few minutes, mix a pail full with the water in the engine, pretty often; and whatever burning wood it is played upon, will be extinguiſhed as if it was dipped in water, and will not burn afreſh in the part extinguiſhed.

Eaſy Method of Extinguiſhing Fire in Chimneys. It is well known, that the inner parts of chimneys eaſily take fire; the ſoot that kindles therein emits a greater flame, according as the tunnel is more elevated, becauſe the inferior air feeds the fire. If this air could therefore be ſuppreſſed, the fire would ſoon be extinguiſhed. In order to this, ſome diſcharge a piſtol into the chimney, which produces no effect: others lay under the chimney a copper full of water; but the vapours that riſe from it, far from extinguiſhing the fire, ſeem to give it new force. Water thrown into the chimney at top is equally of no effect, becauſe it comes down through the middle of the tunnel, and not along the ſides. It would be more adviſable to ſtop with dung the upper orifices of the tunnel for quenching the fire. But the ſureſt and readieſt method is, to take a little gunpowder, and having humected it with ſpittle for binding it, to form it into ſmall maſſes, and ſo throw it into the heart of the chimney. When it is burnt, and has produced a conſiderable vapour, a ſecond, afterwards a third, are thrown, and ſo on, as much as is neceſſary. In a little time the fire is extinguiſhed, and, as it were, choaked by this vapour; and cakes of inflamed ſoot are ſeen to fall from the tunnel, till at laſt not the leaſt veſtige of fire appears.

Securing Buildings againſt Fire. Dr Hales propoſes to check the progreſs of fires by covering the floors of the adjoining houſes with earth. The propoſal is founded on an experiment which he made with a fir-board half an inch thick, part of which he covered with an inch depth of damp garden mould, and then lighted a fire on the ſurface of the mould; though the fire was kept up by blowing, it was two hours before the board was burnt through, and the earth prevented it from flaming. The thicker the earth is laid on the floors, the better: however, Dr Hales apprehends that the depth of an inch will generally be ſufficient; and he recommends to lay a deeper covering on the ſtairs, becauſe the fire commonly aſcends by them with the greateſt velocity. Fire.

M. Hartley made ſeveral trials in the years 1775 and 1776, in order to evince the efficacy of a method which he had invented for reſtraining the ſpread of fire in buildings. For this purpoſe thin iron plates are well nailed to the tops of the joiſts, &c. the edges of the ſides and ends being lapped over, folded together, and hammered cloſe. Partitions, ſtairs, and floors, may be defended in the ſame manner; and plates applied to one ſide have been found ſufficient. The plates are ſo thin as not to prevent the floor from being nailed on the joiſts, in the ſame manner as if this preventative were not uſed: they are kept from ruſt by being painted or varniſhed with oil and turpentine. The expence of this additon, when extending through a whole building, is eſtimated at about 5 *per cent.* Mr Hartley has a patent for this invention, and parliament has voted a ſum of money towards defraying the expence of his numerous experiments. The ſame preſervative may alſo be applied to ſhips, furniture, &c.

Lord Mahon has alſo diſcovered and publiſhed a very ſimple and effectual method of ſecuring every kind of building againſt all danger of fire. This method he has divided into three parts, viz. under-flooring, extra-lathing, and inter-ſecuring.

The method of underflooring is either ſingle or double. In ſingle underflooring, a common ſtrong lath of oak or fir, about one-fourth of an inch thick, ſhould be nailed againſt each ſide of every joiſt, and of every main timber, ſupporting the floor which is to be ſecured. Other ſimilar laths are then to be nailed along the whole length of the joiſts, with their ends butting againſt each other. The top of each of theſe laths or fillets ought to be at $1\frac{1}{2}$ inch below the top of the joiſts or timbers againſt which they are nailed; and they will thus form a ſort of ſmall ledge on each ſide of all the joiſts. Theſe fillets are to be well bedded in a rough plaſter hereafter mentioned, when they are nailed on, ſo that there may be no interval between them and the joiſts; and the ſame plaſter ought to be ſpread with a trowel upon the tops of all the fillets, and along the ſides of that part of the joiſts which is between the top of the fillets and the upper edge of the joiſts. In order to fill up the intervals between the joiſts that ſupport the floor, ſhort pieces of common laths, whoſe length is equal to the width of theſe intervals, ſhould be laid in the contrary direction to the joiſts, and cloſe together in a row, ſo as to touch one another: their ends muſt reſt upon the fillets, and they ought to be well bedded in the rough plaſter, but are not to be faſtened with nails. They muſt then be covered with one thick coat of the rough plaſter, which is to be ſpread over them to the level of the tops of the joiſts: and in a day or two this plaſter ſhould be trowelled over cloſe to the ſides of the joiſts, without covering the tops of the joiſts with it.

In the method of double-flooring, the fillets and ſhort pieces of laths are applied in the manner already deſcribed; but the coat of rough plaſter ought to be little more than half as thick as that in the former method. Whilſt this rough plaſter is laid on, ſome more of the ſhort pieces of laths above mentioned muſt be laid in the intervals between the joiſts upon the firſt

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Fire. coat, and be dipped deep in it. They ſhould be laid as cloſe as poſſible to each other, and in the ſame direction with the firſt layer of ſhort laths. Over this ſecond layer of ſhort laths there muſt be ſpread another coat of rough plaſter, which ſhould be trowelled level with the tops of the joiſts without riſing above them. The rough plaſter may be made of coarſe lime and hair; or, inſtead of hair, hay chopped to about three inches in length may be ſubſtituted with advantage. One meaſure of common rough ſand, two meaſures of ſlacked lime, and three meaſures of chopped hay, will form in general a very good proportion, when ſufficiently beat up together in the manner of common mortar. The hay ſhould be put in after the two other ingredients are well beat up together with water. This plaſter ſhould be made ſtiff; and when the flooring boards are required to be laid down very ſoon, a fourth or fifth part of quicklime in powder, formed by dropping a ſmall quantity of water on the limeſtone a little while before it is uſed, and well mixed with this rough plaſter, will cauſe it to dry very faſt. If any cracks appear in the rough plaſter-work near the joiſts when it is thoroughly dry, they ought to be cloſed by waſhing them over with a bruſh wet with mortar-waſh: this waſh may be prepared by putting two meaſures of quicklime and one of common ſand in a pail, and ſtirring the mixture with water till the water becomes of the conſiſtence of a thin jelly.

Before the flooring boards are laid, a ſmall quantity of very dry common ſand ſhould be ſtrewed over the plaſter-work, and ſtruck ſmooth with an hollow rule, moved in the direction of the joiſts, ſo that it may lie rounding between each pair of joiſts. The plaſter-work and ſand ſhould be perfectly dry before the boards are laid, for fear of the dry rot. The method of under-flooring may be ſucceſsfully applied to a wooden ſtair-caſe; but no ſand is to be laid upon the rough plaſter-work. The method of extra-lathing may be applied to ceiling joiſts, to ſloping roofs, and to wooden partitions.

The third method, which is that of inter-ſecuring, is very ſimilar to that of under-flooring; but no ſand is afterwards to be laid upon it. Inter-ſecuring is applicable to the ſame parts of a building as the method of extra-lathing, but it is ſeldom neceſſary.

Lord Mahon has made ſeveral experiments in order to demonſtrate the efficacy of theſe methods. In moſt houſes it is only neceſſary to ſecure the floors; and the extra-expence of under-flooring, including all materials, is only about nine pence per ſquare yard, and with the uſe of quicklime a little more. The extra-expence of extra-lathing is no more than ſix pence per ſquare yard for the timber ſide-walls and partitions; but for the ceiling about nine pence per ſquare yard. But in moſt houſes no extra-lathing is neceſſary.

Fire-Eater. We have a great number of mountebanks who have procured the attention and wonder of the public by eating of fire, walking on fire, waſhing their hands in melted lead, and the like tricks.

The moſt celebrated of theſe was our countryman Richardſon, much talked of abroad. His ſecret, as related in the *Journal des Sçavans*, of the year 1680, conſiſted in a pure ſpirit of ſulphur, wherewith he rubbed his hands, and the parts that were to touch the fire; which burning and cauteriſing the epidermis, hardened and enabled the ſkin to reſiſt the fire. Fire.

Indeed, this is no new thing: Amb. Paré aſſures us he had tried it on himſelf; that after waſhing the hands in urine, and with unguentum aureum, one may ſafely waſh them in melted lead.

He adds alſo, that by waſhing his hands in the juice of onions, he could bear a hot ſhovel on them while it melted lead.

Fire, in theology. See Hell.

We read of the ſacred fire in the firſt temple of Jeruſalem, which came down from heaven: it was kept with the utmoſt care, and they were forbidden to carry any ſtrange fire into the temple. This fire is one of the five things which the Jews confeſs were wanting in the ſecond temple.

The pagans had their ſacred fires, which they kept in their temples with the moſt religious care, and which were never to be extinguiſhed. Numa was the firſt who built a temple to Fire as a goddeſs, at Rome, and inſtituted an order of prieſteſſes for the preſervation of it. See Vestals.

Fire was the ſupreme god of the Chaldeans; the Magi were worſhippers of fire; and the Greeks and Armenians ſtill keep up a ceremony called the *holy fire*, upon a perſuaſion that every Eaſter-day a miraculous fire deſcends from heaven into the holy ſepulchre, and kindles all the lamps and candles there.

Fire kindled ſpontaneouſly in the Human Body. See *Extraordinary Caſes of* Burning.

Fire-Barrel. See Fire-*Ship*, Note (a).

Fire-Bavins. Ibid. Note (d).

Fire-Arrow, in naval artillery, is a ſmall iron dart furniſhed with ſprings and bars, together with a match impregnated with ſulphur and powder, which is wound about its ſhaft. It is intended to fire the ſails of the enemy, and is for this purpoſe diſcharged from a muſquetoon or ſwivel-gun. The match being kindled by the exploſion, communicates the flame to the ſail againſt which it is directed, where the arrow is faſtened by means of its bars and ſprings. This weapon is peculiar to hot climates, particularly the Weſt Indies, where the ſails being extremely dry by reaſon of the great heats, they inſtantly take fire, and of courſe ſet fire to the maſts and rigging, and laſtly to the veſſel itſelf.

Fire-Ball, in artillery, a compoſition of meal-powder, ſulphur, ſalt-petre, pitch, &c. about the bigneſs of a hand-grenade, coated over with flax, and primed with the ſlow compoſition of a fuze. This is to be thrown into the enemy's works in the night-time, to diſcover where they are; or to fire houſes, galleries, or blinds of the beſiegers; but they are then armed with ſpikes or hooks of iron, that they may not roll off, but ſtick or hang where they are deſired to have any effect. See *Fire*-Balls, and *Light*-Balls.

Balls of Fire, in meteorology, a kind of luminous bodies generally appearing at a great height above the earth, with a ſplendor ſurpaſſing that of the moon; and ſometimes equalling her apparent ſize. They generally proceed in this hemiſphere from north to ſouth with vaſt velocity, frequently breaking into ſeveral ſmaller ones, ſometimes vaniſhing with a report, ſometimes not.

Theſe luminous appearances no doubt conſtitute one part of the ancient prodigies, blazing ſtars or comets, which

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Fire. which laſt they ſometimes reſemble in being attended with a train; but frequently they appear with a round and well defined diſk. The firſt of theſe of which we have any accurate account, was obſerved by Dr Halley and ſome other philoſophers at different places, in the year 1719. From the ſlight obſervations they could take of its courſe among the ſtars, the perpendicular height of this body was computed at about 70 miles from the ſurface of the earth. The height of others has alſo been computed, and found to be various; though in general it is ſuppoſed to be beyond the limits aſſigned to our atmoſphere, or where it loſes its refractive power. The moſt remarkable of theſe on record appeared on the 18th of Auguſt 1783, about nine o'clock in the evening. It was ſeen to the northward of Shetland, and took a ſoutherly direction for an immenſe ſpace, being obſerved as far as the ſouthern provinces of France, and one account ſays that it was ſeen at Rome alſo. During its courſe it appears frequently to have changed its ſhape; ſometimes appearing in the form of one ball, ſometimes of two or more; ſometimes with a train, ſometimes without one. It paſſed over Edinburgh nearly in the zenith, and had then the appearance of a well defined round body, extremely luminous, and of a greeniſh colour; the light which it diffuſed on the ground giving likewiſe a greeniſh caſt to objects. After paſſing the zenith it was attended by a train of conſiderable length, which continually augmenting, at laſt obliterated the head entirely; ſo that it looked like a wedge, flying with the obtuſe end foremoſt. The motion was not apparently ſwift, by reaſon of its great height; though in reality it muſt have moved with great rapidity, on account of the vaſt ſpace it travelled over in a ſhort time. In other places its appearance was very different. At Greenwich we are told, that "two bright balls parallel to each other led the way, the diameter of which appeared to be about two feet; and were followed by an expulſion of eight others, not elliptical, ſeeming gradually to mutilate, for the laſt was ſmall. Between each two balls a luminous ſerrated body extended, and at the laſt a blaze iſſued which terminated in a point. Minute particles dilated from the whole. The balls were tinted firſt by a pure bright light, then followed a tender yellow, mixed with azure, red, green, &c.; which, with a coalition of bolder tints, and a reflection from the other balls, gave the moſt beautiful rotundity and variation of colours that the human eye could be charmed with. The ſudden illumination of the atmoſphere, and the form and ſingular tranſition of this bright luminary, tended much to make it awful: nevertheleſs the amazing vivid appearance of the different balls, and other rich connective parts not very eaſy to delineate, gave an effect equal to the rainbow in the full zenith of its glory."

Dr Blagden, in a paper on this ſubject in the 74th volume of the Philoſophical Tranſactions, has not only given a particular account of this and other meteors of the kind, but added ſeveral conjectures relating to the probable cauſes of them. The firſt thing which occurred to philoſophers on this ſubject was, that the meteors in queſtion were burning bodies riſing from the ſurface of the earth, and flying along the atmoſphere with great rapidity. But this hypotheſis was ſoon abandoned, on conſidering that there was no power known by which ſuch bodies could either be raiſed to a ſufficient height, or projected with the velocity of the meteors. The next hypotheſis was, that they do not conſiſt of one ſingle body, but of a train of ſulphureous vapours, extending a vaſt way through the atmoſphere, and being kindled at one end, diſplay the luminous appearances in queſtion by the fire running from one end of the train to the other. To this hypotheſis, which was invented by Dr Halley, Dr Blagden objects that no juſt explanation is given of the nature of the vapours themſelves, the manner in which they are raiſed up, or in which they can be regularly arranged in ſtraight lines of ſuch vaſt extent; or how they can be ſuppoſed to burn in ſuch rarefied air. "Indeed, (ſays he) it is very difficult to conceive how vapours could be prevented, in thoſe regions where there is in a manner no preſſure, from ſpreading out on all ſides in conſequence of their natural elaſticity, and inſtantly loſing that degree of denſity which ſeems neceſſary for inflammation. Beſides, it is to be expected, that ſuch trains would ſometimes take fire in the middle, and thus preſent the phenomenon of two meteors at the ſame time, receding from one another in a direct line." Fire.

For theſe and other reaſons this hypotheſis of Dr Halley was abandoned, and another ſubſtituted in its place. This was, that the meteors we ſpeak of are permanent ſolid bodies, not riſing from the earth, but revolving round it in very eccentric orbits, and thus in their perigeon moving with inconceivable rapidity. But the Doctor ſhows, that even on this ſuppoſition, the velocity of ſuch bodies muſt ſcarce be one third of that with which fire-balls move, and which has been calculated at upwards of 1000 miles per minute. The hypotheſis is likewiſe liable to a number of other objections which cannot be anſwered, particularly from the variations in their appearance; for it is impoſſible to ſhow in what manner one ſolid and permanent body could aſſume the appearance of eight or ten, as was the caſe with the meteor of 1783; nor can it be ſhown why a body, which in paſſing over Edinburgh appeared with a diſk evidently leſs than that of the ſun ſhould, in paſſing over Greenwich, aſſume the appearance of *two* bodies, each of which had a diſk conſiderably larger than the apparent diſk of that luminary. To obviate, in ſome meaſure, objections of this kind, it has been ſuppoſed that the revolving bodies are ſurrounded by a kind of electrical atmoſphere by which they are rendered luminous; "but (ſays the Doctor) I think, whoever carefully peruſes the various accounts of fire-balls, and eſpecially ours of the 18th of Auguſt, when it divided, will perceive that their phenomena do not correſpond with the idea of a ſolid nucleus involved in a ſubtle fluid, any more than with the idea of another learned gentleman, that they become luminous by means of a contained fluid, which occaſionally explodes through the thick ſolid outer ſhell."

Another hypotheſis, which Dr Blagden has not mentioned, is, that the meteors in queſtion are a kind of bodies which take fire as ſoon as they come within the atmoſphere of the earth. But this cannot be ſuppoſed without implying a previous knowledge of theſe bodies, which it is altogether impoſſible we can have. The only opportunity we have of ſeeing them is when they are on fire. Before that time they are in an inviſible and unknown ſtate; and it is ſurely improper to ar-

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Fire. gue concerning them in this ſtate, or pretend to determine any one of their properties, when we have it not in our power to ſee or inveſtigate them in the leaſt. As the meteors therefore never manifeſt themſelves to our ſenſes but when they are on fire, the only rational concluſion we can draw from thence is, that they have no exiſtence in any other ſtate; and conſequently that their ſubſtance muſt be compoſed of that fluid which, when acting after a certain manner, becomes luminous and ſhows itſelf as fire; remaining inviſible and eluding our reſearches in every other caſe. On this hypotheſis we muſt conclude that the fire-balls are great bodies of electric matter, moving from one part of the heavens where, to our conception, it is ſuperabundant, to another where it is deficient. This opinion is adopted by Dr Blagden for the following reaſons:

1. On account of their prodigious velocity, which is not leſs than 1200 miles in a minute, and ſeems incompatible with any other ſubſtance we know beſides the electric fluid. "This (ſays he) is perhaps the only caſe in which the courſe or direction of that fluid is rendered perceptible to our ſenſes, in conſequence of the large ſcale on which theſe meteors move."

2. Various electrical phenomena have been obſerved to attend them, ſuch as lambent fires ſettling upon men, horſes, &c. and ſparks coming from them, "or the whole meteor itſelf (adds our author), it is ſaid, have damaged ſhips, houſes, &c. after the manner of lightning." This laſt circumſtance, however, we can believe only of another kind of fire-balls, of which we ſhall afterwards treat, which keep at a ſmall diſtance from the earth, or run along its ſurface; for the great meteors of which we now ſpeak, flying at the diſtance of 50 or 60, or more miles from the ſurface of the earth, cannot be leſs from their apparent ſize than a mile or a mile and an half in diameter. Such an immenſe body of electric matter deſcending on the earth, would by its exploſion ruin a large tract of country; and there is no probability that when engendered in ſuch a rare atmoſphere it could break through the whole body of groſs and denſe air which lies between theſe regions and the earth, and which we know reſiſts the paſſage of the electric fluid very ſtrongly. Notwithſtanding this, there is no impoſſibility that the atmoſphere may be electrified to a great degree by ſuch a meteor paſſing over it; and thus electrical appearances may attend theſe bodies without any actual emiſſion of their ſubſtance, as Dr Blagden ſuppoſes. "If there be really (ſays he) any hiſſing noiſe heard while the meteors are paſſing, it ſeems explicable on no other ſuppoſition than that of ſtreams of electric matter iſſuing from them, and reaching the earth with a velocity equal to that of the meteor, namely, in two or three ſeconds. Accordingly, in one of our late meteors, the hiſſing was compared to that of electricity iſſuing from a conductor. The ſparks flying off ſo perpetually from the body of fire-balls may poſſibly have ſome connection with theſe ſtreams. In the ſame manner the ſound of exploſions may perhaps be brought to us quicker than if it were propagated to us by the air alone. Should theſe ideas be well founded, the change of direction, which meteors ſeem at times to undergo, may poſſibly be influenced by the ſtate of the ſurface of the earth over which they are paſſing, and to which the ſtreams are ſuppoſed to reach. A ſimilar cauſe may occaſion the apparent exploſion, the opening of more channels giving new vent and motion to the electric fluid. May not the deviation and exploſion which appear to have taken place in the fire-ball of the 18th of Auguſt over Lincolnſhire, have been determined by its approach towards the fens, and an attraction produced by that large body of moiſture?" Fire.

The exploſion mentioned by our author over Lincolnſhire does not ſeem to have been the only one which happened during the courſe of this meteor. Several people heard reports after it had vaniſhed; and theſe were ſometimes ſingle and ſometimes double. At Edinburgh two reports were heard, the one immediately following the other, at the diſtance of ſix or ſeven minutes after the meteor had paſſed. Theſe reports no doubt indicated a temporary diſſolution of the body; but it is by no means probable that the diſſolution could have taken place either on account of the ſtate of the earth or atmoſphere. We muſt conſider that both earth and atmoſphere are always full of electric fluid; and if there happens to be what is called a *deficiency* (A) in one of them, the other inſtantly ſupplies it. It is impoſſible, therefore, that either the earth or atmoſphere could receive ſuch an immenſe additional quantity in one part without a vent being provided for it ſomewhere elſe. In thunder-ſtorms we naturally conclude that vaſt quantity of electrical matter is put in motion; but from the effects of lightning it appears that this quantity muſt be very trifling in compariſon with what the meteor we now ſpeak of contained. A violent flaſh of lightning has been known to perforate a looking-glaſs, and make only a hole of about an inch diameter. Now we have no reaſon to ſuppoſe that the flaſh, tremendous as it might appear to our eyes, was any other than an electric ſpark of an inch in diameter. The meteor, on the other hand, appears not to have been leſs than a mile in diameter; ſo that the diſproportion betwixt it and a ſingle flaſh of lightning appears almoſt beyond calculation; and we may reaſonably conclude that it could not have been equalled by 10,000 thunder-ſtorms. Had this amazing body of electric fire deſcended through the atmoſphere and diſſipated itſelf on the fens of Lincolnſhire, it muſt have produced the moſt violent and unheard of effects, not only in that place, but probably throughout the whole iſland. Its diſſipation muſt therefore have been in the higher regions, where there was ample ſpace to receive it; and where its exploſion, whatever concuſſion it might make among the etherial matter itſelf, could not affect our earth or atmoſphere in any remarkable

(A) A real deficiency can never happen with regard to the electric fluid in any ſubſtance whatever, as is ſhown at large under the article ELECTRICITY, as well as many others in this work. What ſeems a deficiency is only when the fluid has a tendency to circulate. In this caſe, as the motion muſt begin in one place and return from another, the place where it begins ſeems to be deficient, becauſe the fluid is going away from it; while that from which it returns ſeems, for a ſimilar reaſon, to have too much.

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Fire.

markable degree. Its re-appearance was owing to the ſame tendency in the fluid to circulate which had originally produced it; and which probably was the violent earthquake in Calabria and the eruption in Iceland. See EARTHQUAKE, n° 111.

3. Another argument adduced by Dr Blagden in favour of the electrical origin of fire-balls, is their connection with the aurora borealis, and the reſemblance they bear to theſe phenomena, which are now almoſt univerſally allowed to be electrical. "Inſtances (ſays he) are recorded, where northern lights have been ſeen to join, and form luminous balls, darting about with great velocity, and even leaving a train behind them like the common fire-balls. This train I take to be nothing elſe but the rarefied air left in ſuch an electrified ſtate as to be luminous; and ſome ſtreams of the northern lights are very much like it." The aurora borealis appears to occupy as high, if not a higher region above the ſurface of the earth, as may be judged from the very diſtant countries to which it has been viſible at the ſame time: indeed the great accumulation of electric matter ſeems to lie beyond the verge of our atmoſphere, as eſtimated by the ceſſation of twilight. Alſo with the northern lights a hiſſing noiſe is ſaid to be heard in ſome very cold climates: Gmelin ſpeaks of it in the moſt pointed terms, as frequent and very loud in the north-eaſtern parts of Siberia *; and other travellers have related ſimilar facts."

* See *Aurora Borealis.*

4. Our author thinks that the ſtrongeſt argument for the electrical origin of theſe meteors is the direction of their courſe, which is conſtantly either from the north or north-weſt quarter of the heavens, or towards it; or, as our author thinks, nearly in the direction of the magnetical meridian. Such a courſe, however, ſeems only to belong to the very large fire-balls of which we now ſpeak; the ſmaller ones, called *Falling* STARS, being moved in all directions; "perhaps (ſays the Doctor), becauſe they come further within the verge of our atmoſphere, and are thereby expoſed to the action of extraneous cauſes. That the ſmaller ſort of meteors, ſuch as ſhooting ſtars, are really lower down in the atmoſphere, is rendered very probable by their ſwifter apparent motion: perhaps it is this very circumſtance which occaſions them to be ſmaller, the electric fluid being more divided in more reſiſting air. But as thoſe maſſes of electric matter which move where there is ſcarce any reſiſtance, ſo generally affect the direction of the magnetic meridian, the ideas which have been entertained of ſome analogy between theſe two obſcure powers of nature ſeem not altogether without foundation. If the foregoing conjectures be juſt, diſtinct regions are allotted to the electrical phenomena of our atmoſphere. Here below we have thunder and lightning, from the unequal diſtribution of the electric fluid among the clouds; in the loftier regions, whither the clouds never reach, we have the various gradations of falling ſtars; till, beyond the limits of our corpuſcular atmoſphere, the fluid is put into motion in ſufficient maſſes, to hold a determined courſe, and exhibit the different appearances of what we call *fire-balls*; and probably at a ſtill greater elevation above the earth, the electricity accumulates in a lighter and leſs condenſed form, to produce the wonderfully diverſified ſtreams and coruſcations of the aurora borealis."

Fire.

The paper from whence theſe extracts are taken was written before Mr Morgan's account of the non-conducting power of a perfect vacuum made its appearance. An abſtract of his arguments on this ſubject is given under the article ELECTRICITY, n° 130—137. and their inſufficiency to prove the point intended, is ſhown under the ſame article, n° 277. Under that article, we have only mentioned the *deficiency* in Mr Morgan's argument, without adducing any poſitive proof to the contrary. Such a proof, however, is offered by the meteor in queſtion, or by others of the ſame nature. Dr Halley, ſpeaking of the fire-ball of 1719, the height of which he calculated at very little leſs than 70 miles, expreſſes his ſurpriſe that ſound ſhould be propagated through a medium near 300,000 times rarer than the common air, and the next thing to a perfect vacuum. Now it remains, and for ever will remain, to be proved, that Mr Morgan's moſt perfect vacuum, formed by boiling quickſilver in a tube ever ſo long, contains a medium *more* than 300,000 times rarer than the common atmoſphere. From Mr Cavallo's experiments * it appears, that when air is only rarefied 1000 times, the electric light is exceſſively weak; ſo that there is not the leaſt probability that in an aerial medium 300,000 times rarer than the preſent, if indeed ſuch a medium can exiſt, there could be any light made viſible in the ordinary experiments. We ſee, however, by the many examples of meteors which have occurred at prodigious heights in the atmoſphere, that the electric light in ſuch a rarefied atmoſphere is not only viſible, but acts as vigorouſly in every reſpect as if it were on the ſurface of the earth. This circumſtance therefore affords a complete demonſtration of the fallacy of Mr Morgan's argument, and a direct proof that the electric fluid pervades ſpace as completely diveſted of air as the beſt artificial vacuum we can make; nay, where it is generally believed by mathematicians that the atmoſphere has ceaſed altogether. His other arguments drawn *à priori* are ſtill more inconcluſive than that we have juſt mentioned. He tells us, that if a vacuum was a conductor, the whole quantity of electric matter contained in the earth and atmoſphere would be perpetually flying off through the regions of infinite ſpace, as being ſurrounded by a boundleſs conductor. But even this does not follow, though we ſhould ſuppoſe theſe regions to be an abſolute vacuity; for we know that electricity does not fly to a conducting ſubſtance merely becauſe it is a conductor, but becauſe it opens a paſſage to ſome place whither it has a tendency to go though the conductor was not there. Now, on the preſent hypotheſis, as the conductor would lead to *no place* to which the electric matter had any previous tendency, we cannot aſſign any reaſon why it ſhould acquire a tendency to fly off merely on account of the neighbourhood of a conductor, even though boundleſs. His other objection (that, on the ſuppoſition of a vacuum being capable of conducting electricity, the whole ſpace in the univerſe would be filled with electric fluid) may be admitted in its fulleſt extent, without any detriment whatever to ſcience: and indeed, if we allow the electric fluid to be only a modification of the light of the ſun, as is rendered very probable under the article ELECTRICITY, ſect. vi. as well as that of FIRE, and many others in various places of this work,

* See *Electricity*, n° 142.

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Fire. work, we muſt own that the whole univerſe is filled with it. The meteors in queſtion then will be no other than diſcharges of electricity from one part of the celeſtial ſpaces to another, ſimilar to the diſcharges between the poſitive and negative ſide of an electrified bottle; thus intimating, that a circulation has taken place in the fluid, which the meteor at once completes and puts an end to. See the article METEOROLOGY.

Beſides theſe already juſt mentioned of ſuch vaſt magnitude, there are others much ſmaller and nearer the ſurface of the earth, rolling upon it, or falling upon it, exploding with violence, as is the caſe with thoſe which appear in the time of thunder, and frequently produce miſchievous effects. One of theſe is mentioned by ſome authors as falling in a ſerene evening in the iſland of Jamaica; exploding as ſoon as it touched the ſurface of the ground, and making a conſiderable hole in it. Another is mentioned by Dr Prieſtley as rolling along the ſurface of the ſea, then riſing and ſtriking the top-maſt of a man of war, exploding, and damaging the ſhip. In like manner we hear of an electrified cloud at Java in the Eaſt Indies; whence, without any thunder-ſtorm, there iſſued a vaſt number of fire-balls, which did incredible miſchief. This laſt phenomenon points out to us the true origin of balls of this kind, viz. an exceſſive accumulation of electricity in one part, or a violent tendency to circulate, when at the ſame time the place where the motion begins is at ſo great a diſtance, or meets with other obſtacles of ſuch a nature, that it cannot eaſily get thither. Urged on, however, by the vehement preſſure from behind, it is forced to leave its place; but being equally unable to diſplace the great quantity of the ſame fluid, which has no inclination to move the ſame way with itſelf, it is collected into balls, which run hither and thither, according as they meet with conductors capable of leading them, into ſome part of the circle. This is even confirmed by an experiment related at the end of Dr Prieſtley's fifth volume on Air. He relates, that a gentleman having charged, with a very powerful machine, a jar, which had the wire ſupporting the knob of a conſiderable length, and paſſed through a glaſs-tube, a globe of fire was ſeen to iſſue out of it. This globe gradually aſcended up the glaſs-tube till it came to the top of the knob, where it ſettled, turning ſwiftly on its axis, and appearing like a red-hot iron ball of three quarters of an inch diameter. On continuing to turn the machine, it gradually deſcended into the jar; which it had no ſooner done, than there enſued a moſt violent exploſion and flaſh, the jar being diſcharged and broken at the ſame time. This experiment, however, is ſingular in its kind; for neither the gentleman who performed it, nor any other, has yet been able to repeat it. Single as it is, however, we may yet gather from it, that a fire-ball will be the conſequence of a very violent electrification of any ſubſtance, provided at the ſame time that the air be in a very non-conducting ſtate, ſo that the electricity may not evaporate into it as faſt as it is collected; for this would produce only lucid ſtreams and flaſhes, as in the common experiments with the Leyden phial: and it is probably an inattention to this circumſtance which has hitherto prevented the repetition of the experiment above-mentioned. The caſe is the ſame in thunder-ſtorms, where an exceſſive accumulation of electric matter always produces fire-balls, the moſt miſchievous kind of lightning, as is explained under that article. Fire.

With regard to the uſes which fire-balls ſerve in the ſyſtem of nature, it is plain that they are the means of preſerving the equilibrium in the electric fluid in the atmoſphere, which would otherwiſe produce the moſt dreadful tempeſts. Under the article *Aurora Borealis*, it is ſhown why there muſt be a conſtant current of electric matter through the bowels of the earth from the equator to the poles, and from the poles to the equator through the atmoſphere. The great meteors ſerve for keeping up the equilibrium in this great atmoſpherical current, while the ſmaller ones anſwer a like purpoſe in the general maſs of electric matter diſperſed over the ſurface of the earth, and therefore are ſeen to move in all directions, as the equilibrium happens to require them in different parts. With regard to thoſe which are obſerved in the lower regions of the earth, or rolling on the ſurface of the ground itſelf, they undoubtedly anſwer purpoſes of a ſimilar kind in theſe lower regions; for as fire-balls in general are produced by a great exceſs of electricity in one place, there muſt of courſe be an equal deficiency in another; and to reſtore the equilibrium, or, to ſpeak more properly, to prevent a dangerous commotion from taking place throughout the whole maſs of electric fluid, the fire-ball breaks forth, and either puts a ſtop at once to the diſturbance by an exploſion, or by a ſilent and inviſible evaporation. From ſome accounts indeed it would ſeem that even the large celeſtial meteors detached part of their ſubſtance to accompliſh this purpoſe; though, for the reaſons already given, it would ſeem more probable that they operated by electrifying the atmoſphere, or ſetting the fluid contained in it in motion, ſo as to produce ſmall fire-balls of itſelf, rather than by detaching any part of their own bodies to ſuch a diſtance. Dr Blagden, in the paper above quoted, gives an account of an appearance of this kind. It was deſcribed in a letter to Sir Joſeph Banks from the Abbé Mann, director of the academy at Bruſſels. "It happened (ſays the Abbé) at Mariekercke, a ſmall village on the coaſt, about half a mile weſt of Oſtend. The curate of the village was ſitting in the duſk of the evening with a friend, when a ſudden light ſurpriſed them, and, immediately after a ſmall ball of light-coloured flame came through a broken pane of glaſs, croſſed the room where they were ſitting, and fixed itſelf on the chink of a door oppoſite to the window where it entered, and there died gradually away. It appeared to be a kind of phoſphoric light carried along by the current of air. The curate and his friend, greatly ſurpriſed at what they ſaw, apprehended fire in the neighbourhood; but going out, found that the fire which had come in through the window had been detached from a large meteor in its paſſage."

Fire-Cocks. Churchwardens in London and within the bills of mortality, are to fix fire-cocks at proper diſtances in ſtreets, and keep a large engine and hand-engine for extinguiſhing fire, under the penalty of 10l. ſtat. 6 Ann. *c.* 31.

On the breaking out of any fire in London or Weſtminſter, the conſtables and beadles of pariſhes ſhall repair

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Fire. pair to the place with their ſtaves, and aſſiſt in extinguiſhing it, and cauſe the people to work for that end, &c.

Fire-Engine. See *Steam-Engine.*

Fire-Flair, in ichthyology. See Raja.

Fire-Flies, a ſpecies of flies common in Guiana, of which there are two ſpecies. The largeſt is more than an inch in length, having a very large head connected with the body by a joint of a particular ſtructure, with which at ſome times it makes a loud knock, particularly when laid on its back. The fly has two feelers or horns, two wings, and ſix legs. Under its belly is a circular patch, which, in the dark, ſhines like a candle; and on each ſide of the head near the eyes is a prominent, globular, luminous body, in ſize about one-third larger than a muſtard ſeed. Each of theſe bodies is like a living ſtar, emitting a bright, and not ſmall, light; ſince two or three of theſe animals, put into a glaſs-veſſel, afford light ſufficient to read without difficulty, if placed cloſe to the book. When the fly is dead, theſe bodies will ſtill afford conſiderable light, tho' it is leſs vivid than before; and if bruiſed, and rubbed over the hands or face, they become luminous in the dark, like a board ſmeared over with Engliſh phoſphorus. They have a reddiſh-brown or cheſnut colour; and live in rotten trees in the day, but are always abroad in the night. The other kind is not more than half as large as the former: their light proceeds from under their wings, and is ſeen only when they are elevated, like ſparks of fire appearing or diſappearing at every ſecond. Of theſe the air is full in the night, tho' they are never ſeen in the day. They are common not only in the ſouthern, but in the northern parts of America, during the ſummer.

Fire-Lock, or *Fuſil*, a ſmall gun which fires with a flint. It is diſtinguiſhed from an old muſket, or match-lock, which was fired with a match. The fire-lock is now in common uſe in the European armies.

Fire-Philoſophers, or *Philoſophi per ignem*, a fanatical ſect of philoſophers who appeared towards the cloſe of the 16th century, and made a figure in almoſt all the countries of Europe. The diſtinguiſhing tenet from which they derived this appellation was, that the intimate eſſences of natural things were only to be known by the trying efforts of fire, directed in a chemical proceſs. They were alſo called *Theoſophiſts*, from their declaring againſt human reaſon as a dangerous and deceitful guide, and repreſenting a divine and ſupernatural illumination as the only means of arriving at truth: they were likewiſe denominated *Paracelſiſts*, from the name of Paracelſus, the eminent phyſician and chemiſt, who was the chief ornament and leader of this extraordinary ſect. It was patroniſed in England by Robert Flood or Fludd, who endeavoured to illuſtrate the philoſophy of Paracelſus in a great number of treatiſes; in France, it was zealouſly propagated by Rivier; in Denmark, by Severinus; in Germany, by Kunrath, an eminent phyſician of Dreſden; and in other countries by warm and ſucceſsful votaries, who aſſumed a ſtriking air of piety and devotion, and propoſed to themſelves no other end than the advancement of the divine glory, and the reſtoration of peace and concord in a divided church: accordingly they were joined by ſeveral perſons eminent for their piety, and diſtinguiſhed by their zeal for the advancement of true religion. One of the moſt celebrated of theſe was Daniel Hoffman, profeſſor of divinity in the univerſity of Helmſtadt, who, availing himſelf of ſome unguarded paſſages in the writings of Luther, extravagantly maintained, that philoſophy was the mortal enemy of religion; that truth was diviſible into two branches, the philoſophical and theological; and that what was true in philoſophy was falſe in theology. Hoffman was afterwards obliged, by the interpoſition of Henry Julius, duke of Brunſwick, to retract his invectives againſt philoſophy, and to acknowledge in the moſt open manner the harmony and union of ſound philoſophy with true and genuine theology. Fire.

Fire-Places are contrivances for communicating heat to rooms, and alſo for anſwering various purpoſes of art and manufacture. See Chimney, Furnace, and Stove.

The late ingenious Dr Franklin, having recounted the inconveniences and advantages of fire-places in common uſe, propoſes a new contrivance for this purpoſe, called the *Pennſylvania fire-place*. 1. This machine conſiſts of a bottom-place or hearth-piece (ſee fig. 1.) with a riſing moulding before for a fender, two perforated ears *F*, *G*, for receiving two ſcrew-rods; a long air-hole *a a*, through which the outward air paſſes into an air-box; and three ſmoke-holes repreſented by dark ſquares in *BC*, thro' which the ſmoke deſcends and paſſes away; beſides, double ledges for receiving between them the lower edges of the other plates. 2. A back plate without holes, and furniſhed with a pair of ledges to receive, 3. The two ſide-plates, each of which has a pair of ledges to receive the ſide-edges of the front plate, with a ſhoulder on which it reſts; two pair of ledges to receive the ſide-edges of the two middle plates which form the air-box, and an oblong air-hole near the top, through which the air warmed in the box is diſcharged into the room, and a wing or bracket as *H*, and a ſmall hole as *R*, for the axis of the regiſter to turn in. See fig. 2. which repreſents one of theſe plates. 4. An air-box, compoſed of the two middle plates *D E* and *F G*, fig. 3. and 4. The firſt has five thin ledges or partitions caſt on it, the edges of which are received into ſo many pair of ledges caſt in the other: the tops of all the cavities formed by theſe thin deep ledges are alſo covered by a ledge of the ſame form and depth caſt with them; ſo that when the plates are put together, and the joints luted, there is no communication between the air-box and the ſmoke. In the winding paſſages of this box, freſh air is warmed as it paſſes into the room. 5. A front-plate, which is arched on the under ſide, and ornamented with foliages, &c. 6. A top plate, with a pair of ears *M*, *N*, (fig. 5.) anſwerable to thoſe in the bottom plate, and perforated for the ſame purpoſe. It has alſo a pair of ledges running round the under ſide to receive the top edges of the front, back, and ſide plates. The air-box does not reach up to the top-plate by 2½ inches. Plate CXCIII.

All theſe plates are of caſt iron; and when they are all in their proper places, they are bound firmly together by a pair of ſlender rods of wrought iron with ſcrews, and the machine appears as in fig. 5. There are alſo two thin plates of wrought iron, viz. 7. The ſhutter, which is of ſuch a length and breadth as to cloſe well the opening of the fire-place, and ſerving to blow

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Fire. blow up the fire, and to ſecure it in the night. It is raiſed or depreſſed by means of two braſs knobs, and ſlides in a groove left between the foremoſt ledge of the ſide plates and the face of the front plate. 8. The regiſter, which is placed between the back plate and air-box, and furniſhed with a key; ſo that it may be turned on its axis, and made to lie in any poſition between level and upright. The operation of this machine, and the method of fixing it, may be underſtood by obſerving the profile of the chimney and fire-places in fig. 6. *M* is the mantle-piece or breaſt of the chimney; *C* the funnel; *B* the falſe back, made of brick-work in the chimney, four inches or more from the true back, from the top of which a cloſing is to be made over to the breaſt of the chimney, that no air may paſs into the chimney except that which goes under the falſe back, and up behind it; *E* the true back of the chimney; *T* the top of the fire-place; *F* the front of it; *A* the place where the fire is made; *D* the air-box; *K* the hole in the ſide plate, thro' which the warmed air is diſcharged out of the air-box into the room; *H* the hollow, formed by removing ſome bricks from the hearth under the bottom plate filled with freſh air, entering at the paſſage *I*, and aſcending into the air-box through the air-hole in the bottom plate near *G*, the partition in the hollow, deſigned to keep the air and ſmoke apart; *P* the paſſage under the falſe back, and part of the hearth for the ſmoke; and the arrows in the figure ſhow the courſe of the ſmoke. The fire being made at *A*, the flame and ſmoke will aſcend, ſtrike the top *T*, and give it a conſiderable heat; the ſmoke will turn over the air-box, and deſcend between it and the back plate to the holes near *G* in the bottom plate, heating in its paſſage all the plates of the machine; it will then proceed under and behind the falſe back, and riſe into the chimney. The air of the room contiguous to the ſeveral plates, and warmed by them, becomes ſpecifically lighter than the other air in the room, and is obliged to riſe; but being prevented by the cloſure over the fire-place from going up the chimney, is forced out into the room, and riſing by the mantle-piece to the ceiling, is again driven down gradually by the ſteam of newly-warmed air that follows; and thus the whole room becomes in a little time equally warmed. The air alſo, warmed under the bottom plate and in the air-box, riſes and comes out of the holes in the ſide plates, and thus warming and continually changing the air of the room. In the cloſing of the chimney a ſquare opening for a trap-door ſhould be left for the ſweeper to go up: the door may be made of ſlate or tin, and ſo placed, that by turning up againſt the back of the chimney when open, it cloſes the vacancy behind the falſe back, and ſhoots the ſoot that falls in ſweeping out upon the hearth. It will alſo be convenient to have a ſmall hole, about five or ſix inches ſquare, cut near the ceiling thro' into the funnel, and provided with a ſhutter; by occaſionally opening which, the heated air of the room and ſmoke of tobacco, &c. may be carried off without incommoding the company. For a farther account of the manner of uſing this fire-place, the advantages attending it, anſwers to objections, and directions to the brick-layer in fixing it, the curious reader may conſult Franklin's Letters and Papers on Philoſophical Subjects, p. 284—318. edit. 1769. Fire.

Fire-Pots, in the military art, ſmall earthen pots, into which is put a charged grenade, and over that powder enough till the grenade is covered; then the pot is covered with a piece of parchment, and two pieces of match acroſs lighted: this pot being thrown by a handle of matches where it is deſigned, it breaks and fires the powder, and burns all that is near it, and likewiſe fires the powder in the grenade, which ought to have no fuſe, to the end its operations may be the quicker.

Fire-Reeds. See the next article, Note (c.)

Fire Ship, an old veſſel filled with combuſtible materials, and fitted with grappling irons to hook, and ſet fire to, the enemies ſhips in battle, &c.

As there is nothing particular in the conſtruction of this ſhip, except the apparatus by which the fire is inſtantly conveyed from one part to another, and from thence to the enemy, it will be ſufficient to deſcribe the fire room, where theſe combuſtibles are encloſed, together with the inſtruments neceſſary to grapple the ſhip intended to be deſtroyed.

The fire-room is built between decks, and limited on the after part by a *bulk-head*, *L*, behind the main-maſt, from which it extends quite forward, as repreſented in Plate CXCIII. The train incloſed in this apartment is contained in a variety of wooden troughs, *D*, *G*, which interſect each other in different parts of the ſhip's length; being ſupported at proper diſtances by croſs-pieces and ſtanchions. On each ſide of the ſhip are ſix or ſeven ports, *H*, about 18 inches broad and 15 inches high; and having their lids to open downward, contrary to the uſual method.

Againſt every port is placed an iron chamber (A), which, at the time of firing the ſhip, blows out the port lid, and opens a paſſage for the flame. Immediately under the main and fore-ſhrouds is fixed a wooden funnel *M*; whoſe lower end communicates with a fire-barrel (B), by which the flame paſſing thro' the

(A) The iron-chambers are 10 inches long and 3.5 in diameter. They are breeched againſt a piece of wood fixed acroſs the ports, and let into another a little higher. When loaded, they are almoſt filled with corn-powder, and have a wooden tompion well driven into their muzzles. They are primed with a ſmall piece of quick-match thruſt through their vents into the powder, with a part of it hanging out. When the ports are blown open by means of the iron-chambers, the port-lids either fall downward, or are carried away by the exploſion.

(B) The fire-barrels ought to be of a cylindrical form, as moſt ſuitable to contain the reeds with which they are filled, and more convenient for ſtowing them between the troughs in the fire-room. Their inſide chambers ſhould not be leſs than 21 inches, and 30 inches is ſufficient for their length. The bottom parts are firſt well ſtored with

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Fire. *Falconer's Marine Dictionary.*

the funnel is conducted to the ſhrouds. Between the funnels, which are likewiſe called *fire-trunks*, are two ſcuttles, or ſmall holes in the upper deck, ſerving alſo to let out the flames. Both funnels muſt be ſtopped with plugs, and have ſail-cloth or canvas nailed cloſe over them, to prevent any accident happening from above to the combuſtibles laid below.

The ports, funnels, and ſcuttles, not only communicate the flames to the outſide and upper-works of the ſhip and her rigging; but likewiſe open a paſſage for the inward air, confined in the fire-room, which is thereby expanded ſo as to force impetuouſly through thoſe out-lets, and prevent the blowing up of the decks, which muſt of neceſſity happen from ſuch a ſudden and violent rarefaction of the air as will then be produced.

On each ſide of the bulk-head behind is cut a hole *L*, of ſufficient ſize to admit a trough of the ſame dimenſions as the others. A leading trough, *L I*, whoſe foremoſt end communicates with another trough within the fire-room, is laid cloſe to this opening, from whence it extends obliquely to a ſally-port *I*, cut thro' the ſhip's ſide. The decks and troughs are well covered with melted roſin. At the time of the firing either of the leading troughs, the flame is immediately conveyed to the oppoſite ſide of the ſhip, whereby both ſides burn together.

The ſpaces *N*, *O*, behind the fire-room, repreſent the cabins of the lieutenant and maſter, one of which is on the ſtarboard, and the other on the larboard ſide. The captain's cabin, which is ſeparated from theſe by a bulk-head, is exhibited alſo by *P*.

Four of the eight fire-barrels are placed under the four fire-trunks; and the other four between them, two on each ſide the fire-ſcuttles, where they are ſecurely cleated to the deck. The longeſt reeds (c) are put into the fore and aft troughs, and tied down: the ſhorteſt reeds are laid in the troughs athwart, and tied down alſo. The bavins (d), dipped at one end, are tied faſt to the troughs over the reeds, and the curtains are nailed up to the beams, in equal quantities, on each ſide of the fire-room. Fire.

The remainder of the reeds are placed in a poſition nearly upright, at all the angles of every ſquare in the fire-room, and there tied down. If any reeds are left, they are to be put round the fire-barrels, and other vacant places, and there tied faſt.

Inſtructions to prime.

Take up all your reeds, one after another, and ſtrow a little compoſition at the bottom of all the troughs under the reeds, and then tie them gently down again: next ſtrow compoſition upon the upper part of the reeds throughout the fire-room; and upon the ſaid compoſition lay double quick-match upon all the reeds, in all the troughs: the remainder of the compoſition ſtrow over all the fire-room, and then lay your bavins looſe.

Caſt off all the covers of the fire-barrels, and hang the quick-match looſe over their ſides, and place leaders of quick-match from the reeds into the barrels, and from thence into the vent of the chambers, in ſuch a manner as to be certain of their blowing open the ports, and ſetting fire to the barrels. Two troughs of communication from each door of the fire-room to the ſally-ports, muſt be laid with a ſtrong leader of quick-match,

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with ſhort double-dipped reeds placed upright; and the remaining vacancy is filled with fire-barrel compoſition well mixed and melted, and then poured over them. The compoſition uſed for this purpoſe is a maſs of ſulphur, pitch, tar, and tallow.

There are five holes, of three-fourths inch in diameter and three inches deep, formed in the top of the compoſition while it is yet warm; one being in the centre, and the other four at equal diſtances round the ſides of the barrel. When the compoſition is cold and hard, the barrel is primed by filling thoſe holes with fuſe-compoſition, which is firmly driven into them, ſo as to leave a little vacancy at the top to admit a ſtrand of quick-match twice doubled. The centre-hole contains two ſtrands at their whole length, and every ſtrand muſt be driven home with mealed powder. The looſe ends of the quick-match being then laid within the barrel, the whole is covered with a dipped curtain, faſtened on with a hoop that ſlips over the head of the barrel, to which it is nailed.

The barrels ſhould be made very ſtrong, not only to ſupport the weight of the compoſition before firing, when they are moved or carried from place to place, but to keep them together whilſt burning: for if the ſtaves are too light and thin, ſo as to burn very ſoon, the remaining compoſition will tumble out and be diſſipated, and the intention of the barrels, to carry the flame aloft, will accordingly be fruſtrated.

The curtain is a piece of coarſe canvas, nearly a yard in breadth and length, thickened with melted compoſition, and covered with ſaw-duſt on both ſides.

(c) The reeds are made up in ſmall bundles of about a foot in circumference, cut even at both ends, and tied together in two places. They are diſtinguiſhed into two kinds, viz. the long and ſhort; the former of which are four feet, and the latter two feet five inches in length. One part of them are ſingly dipped, i. e at one end: the reſt are dipped at both ends in a kettle of melted compoſition. After being immerſed about ſeven or eight inches in this preparation, and then drained, they are ſprinked over with pulveriſed ſulphur upon a tanned hide.

(d) The bavins are made of birch, heath, or other bruſh-wood, which is tough and readily kindled. They are uſually two or three feet in length, and have all their buſh-ends lying one way, the other ends being tied together with ſmall cords. They are dipped in compoſition at the buſh-ends, whoſe branches are afterwards confined by the hand, to prevent them from breaking off by moving about; and alſo to make them burn more fiercely. After being dipped in the ſame manner as the reeds, they alſo are ſprinkled with ſulphur.

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Fire. match, four or five times double; alſo a croſs-piece to go from the ſally-port, when the ſhip is fired, to the communication trough, laid with leaders of quick-match, that the fire may be communicated in both ſides at once.

What quick-match is left place ſo that the fire may be communicated to all parts of the room at once, eſpecially about the ports and fire-barrels, and ſee that the chambers are well and freſh primed. [N. B. The port-fire uſed for firing the ſhip, burns about 12 minutes. Great care muſt be taken to have no powder on board when the ſhip is fired.]

The ſheer-hooks (repreſented by *A*) are fitted ſo as to faſten on the yard-arms of the fire-ſhip, where they hook the enemy's rigging. The fire-grapplings, (*B.*) are either fixed on the yard-arms, or thrown by hand, having a chain to confine the ſhips together, or faſten thoſe inſtruments wherever neceſſary.

When the commanding officer of a fleet diſplays the ſignal to prepare for action, the fire-ſhips fix their ſheer-hooks, and diſpoſe their grapplings in readineſs. The battle being begun, they proceed immediately to prime, and prepare their fire works. When they are ready for grappling, they inform the admiral thereof by a particular ſignal.

To avoid being diſabled by the enemy's cannon during a general engagement, the fire ſhips continue ſufficiently diſtant from their line of battle, either to windward or to leeward.

They cautiouſly ſhun the openings or intervals of the line, where they would be directly expoſed to the enemy's fire, from which they are covered by lying on the oppoſite ſide of their own ſhips. They are attentively to obſerve the ſignals of the admiral or his ſeconds, in order to put their deſigns immediately in execution.

Although no ſhip of the line ſhould be previouſly appointed to protect any fire-ſhip, except a few of the ſmalleſt particularly deſtined to this ſervice, yet the ſhip before whom ſhe paſſes in order to approach the enemy, ſhould eſcort her thither, and aſſiſt her with an armed boat, or whatever ſuccour may be neceſſary in her ſituation.

The captain of the fire-ſhip ſhould himſelf be particularly attentive that the above inſtructions are punctually executed, and that the yards may be ſo braced when he falls along-ſide of the ſhip intended to be deſtroyed, that the ſheer-hooks and grapplings faſtened to the yard-arms, &c. may effectually hook the enemy. He is expected to be the laſt perſon who quits the veſſel; and being furniſhed with every neceſſary aſſiſtance and ſupport, his reputation will greatly depend on the ſucceſs of his enterpriſe.

Lambent Fires, as the ſhining of meat at certain ſeaſons, the luminouſneſs of the ſea, of inſects, vapours, &c. See the articles Light, Pholas Medusa, Nereis, *Fire-Flies*, *Glow-Worm*, &c.

Port-Fire. See *Port-Fire*.

Spur-Fire. See *Spur-Fire*.

Fire-Works, are preparations made of gunpowder, ſulphur, and other inflammable and combuſtible ingredients, uſed on occaſion of public rejoicings and other ſolemnities.

The invention of fire-works is by M. Mahudel attributed to the Florentines and people of Sienna; who found out likewiſe the method of adding decorations to them of ſtatues, with fire iſſuing from their eyes and mouths. Firing.

The art of preparing and managing theſe is called *pyrotechny*. See Pyrotechny.

FIRING, in the military art, denotes the diſcharge of the fire-arms; and its object is to do the utmoſt execution to the enemy.

The preſent method of firing by platoons is ſaid to have been invented by Guſtavus Adolphus, and firſt uſed about the year 1618: the reaſon commonly given for this method is, that a conſtant fire may be always kept up. There are three different ways of platoon firing; viz. ſtanding, advancing, and retreating. But previous to every kind of firing, each regiment or battalion muſt be told off in grand diviſions, ſubdiviſions, and platoons, excluſively of the grenadiers, which form two ſubdiviſions or four platoons of themſelves. In firing ſtanding, either by diviſions or platoons, the firſt fire is from the diviſion or platoon on the right; the ſecond fire from the left; the third from the right again; and ſo on alternately, till the firing comes to the centre platoon, which is generally called the *colour platoon*, and does not fire, remaining as a reſerve for the colours. Firing advancing is performed in the ſame manner, with this addition, that before either diviſion or platoon fires, it advances three paces forward. Firing retreating varies from either of the former methods; for before either diviſion or platoon fires, if they are marching from the enemy, it muſt go to the right about, and after firing, to the left about again, and continue the retreat as ſlow and orderly as poſſible.

In hedge-firing the men are drawn up two deep, and in that order both ranks are to fire ſtanding. Oblique firing is either to the right and left, or from the right and left to the centre, according to the ſituation of the object. The Pruſſians have a particular contrivance for this purpoſe; if they are to level to the right, the rear ranks of every platoon make two quick but ſmall paces to the left, and the body of each ſoldier turns one-eighth of a circle, and *vice verſa*. Parapet firing depends on the nature of the parapet over which the men are to fire, and alſo upon that of the attack made to poſſeſs it. This method of firing is ſometimes performed by ſingle ranks ſtepping on the banquette and firing; each man inſtantly handing his arms to the centre rank of the ſame file, and taking his back in the room of it; and the centre rank giving it to the rear to load, and forwarding the arms of the rear to the front rank; by which means the front rank men can fire ſix or ſeven rounds in a minute with exactneſs. Parapet firing may alſo be executed two deep, when the banquette is three feet broad, or in field works, where no banquettes are made. Square firing is performed by a regiment or body of men drawn up in a hollow ſquare, in which caſe each front is generally divided into four diviſions or firings, and the flanks of the ſquare, being the weakeſt part, are covered by four platoons of grenadiers. The firſt fire is from the right diviſion of each face; the ſecond from the left diviſion of each face, &c. and the grenadiers make the laſt fire. Street-firing is practiſed in two ways; either by making the diviſion or platoon that has fired to wheel by half-rank to the right and left

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Firkin
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First-born.

left outwards from the centre, and to march in that order by half diviſions down the flanks on each ſide of the column, and to draw up in the rear, and go on with their priming and loading; or, to make the diviſion or platoon, after firing, to face to the right and left outwards from the centre, and one half rank to follow the other; and in that order to march in one centre file down on each ſide of the column into the rear, and there draw up as before.

Firing-Iron, in farriery, an inſtrument not unlike the blade of a knife; which being made red hot, is applied to a horſe's hams, or other places ſtanding in need of it, as in preternatural ſwellings, farcy, knots, &c. in order to diſcuſs them.

FIRKIN, an Engliſh meaſure of capacity for things liquid, being the fourth part of the barrel: it contains eight gallons of ale, ſoap, or herrings; and nine gallons of beer.

FIRLOT, a dry meaſure uſed in Scotland. The oat-firlot contains 21¼th pints of that country; the wheat-firlot contains about 2211 cubical inches; and the barley-firlot, 31 ſtandard-pints. Hence it appears that the Scotch wheat-firlot exceeds the Engliſh buſhel by 33 cubical inches.

FIRMAMENT, in the ancient aſtronomy, the eighth heaven or ſphere; being that wherein the fixed ſtars were ſuppoſed to be placed. It is called the *eighth*, with reſpect to the ſeven heavens or ſpheres of the planets which it ſurrounds.

It is ſuppoſed to have two motions; a diurnal motion, given it by the *primum mobile*, from eaſt to weſt, about the poles of the ecliptic; and another oppoſite motion from weſt to eaſt; which laſt it finiſhes, according to Tycho, in 25,412 years; according to Ptolemy, in 36,000; and according to Copernicus, in 258,000; in which time the fixed ſtars return to the ſame preciſe points wherein they were at the beginning. This period is commonly called Plato's year, or the great year.

In various places of Scripture the word *firmament* is uſed for the middle region of the air. Many of the ancients allowed, with the moderns, that the firmament is a fluid matter; though they, who gave it the denomination of *firmament*, muſt have taken it for a ſolid one.

FIRMAN, is a paſſport or permit granted by the Great Mogul to foreign veſſels, to trade within the territories of his juriſdiction.

FIRMICUS MATERNUS (Julius), a famous writer, who compoſed in Latin, about the year 345, an excellent book in defence of Chriſtianity, intitled, *De errore profanarum religionum*, which is printed with the notes of John Wouver. There are alſo attributed to him eight books of aſtronomy, printed by Aldus Manutius in 1501; but this laſt work appears to have been written by another Julius Firmicus, who lived at the ſame time.

FIRMNESS, denotes the conſiſtence of a body, or that ſtate wherein its ſenſible parts cohere in ſuch a manner, that the motion of one part induces a motion in the reſt.

FIRST-BORN. See PRIMOGENITURE, for the literal meaning of the term.

In Scripture it is alſo uſed often in a figurative ſenſe for that which is firſt, moſt excellent, moſt diſtinguiſhed in any thing. Thus it is ſaid of Chriſt (Col. i. 5.), that he is "the firſt-born of every creature;" and in Revelations (i. 5.) he is called "the firſt-begotten of the dead;" that is, according to the commentators, Begotten of the Father before any creature was produced; and the firſt who roſe from the dead by his own power. "The firſt-born of the poor," (Iſa. xiv. 30.) ſignifies, The moſt miſerable of all the poor; and in Job (xviii. 13.) "The firſt-born of death;" that is, The moſt terrible of all deaths.

First-fruits
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F.ſh.

First-Fruits (primitiæ), among the Hebrews, were oblations of part of the fruits of the harveſt, offered to God as an acknowledgment of his ſovereign dominion. The firſt of theſe fruits was offered in the name of the whole nation, being either two loaves of bread, or a ſheaf of barley which was threſhed in the court of the temple. Every private perſon was obliged to bring his firſt-fruits to the temple; and theſe conſiſted of wheat, barley, grapes, figs, apricots, olives, and dates.

There was another ſort of firſt-fruits which were paid to God. When bread was kneaded in a family, a portion of it was ſet apart, and given to the prieſt or Levite who dwelt in the place: if there was no prieſt or Levite there, it was caſt into the oven, and conſumed by the fire. Theſe offerings made a conſiderable part of the revenues of the Hebrew prieſthood.

Firſt-fruits are frequently mentioned in ancient Chriſtian writers as one part of the church revenue. One of the councils of Carthage enjoins, that they ſhould conſiſt only of grapes and corn; which ſhows, that this was the practice of the African church.

First-Fruits, in the church of England, are the profits of every ſpiritual benefice for the firſt year, according to the valuation thereof in the king's books.

FISC, FISCUS, in the civil law, the treaſury of a prince or ſtate; or that to which all things due to the public do fall. The word is derived from the Greek φισκος "a great baſket," uſed when they went to market.—By the civil law, none but a ſovereign prince has a right to have a fiſc or public treaſury.

At Rome, under the emperors, the term *erarium* was uſed for the revenues deſtined for ſupport of the charges of the empire; and *fiſcus* for thoſe of the emperor's own family. The treaſury, in effect, belonged to the people, and the fiſcus to the prince. Hence the goods of condemned perſons, if appropriated to the uſe of the public, were ſaid *publicari*; if to the ſupport of the emperor or prince, *confiſcari*.

FISCAL, in the civil law, ſomething relating to the pecuniary intereſt of the prince or people. The officers appointed for the management of the fiſc, were called *procuratores fiſci*; and *advocati fiſci*; and among the caſes enumerated in the conſtitutions of the empire where it was their buſineſs to plead, one is againſt thoſe who have been condemned to pay a fine to the fiſc on account of their litigiouſneſs or frivolous appeals.

FISCUS. See FISC.

FISH, in natural hiſtory, an animal that lives in the waters as the natural place of its abode.

Fiſhes form the fourth claſs of animals in the Linnæan ſyſtem. Their moſt general or popular diviſion is into *freſh* and *ſalt* water ones. Some, however, are of opinion, that all fiſhes naturally inhabit the ſalt-waters, and that they have mounted up into rivers

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Fiſh. only by accident. A few ſpecies only ſwim up into the rivers to depoſit their ſpawn; but by far the greateſt number keep in the ſea, and would ſoon expire in freſh water. There are about 400 ſpecies of fiſhes (according to Linnæus) of which we know ſomething: but the unknown ones are ſuppoſed to be many more; and as they are thought to lie in great depths of the ſea remote from land, it is probable that many ſpecies will remain for ever unknown.

For the ſubdiviſions, characters, and natural hiſtory of this claſs of animals, ſee the articles ICHTHYOLOGY and ZOOLOGY.

Blowing of FISH, is a practice ſimilar to that of blowing fleſh, poultry, and pigs, and adopted for the ſame deceitful purpoſes. The method of blowing fiſh, eſpecially cod and whitings, is by placing the end of a quill or tobacco-pipe at the vent, and pricking a hole with a pin under the fin which is next the gill; thereby making the fiſh appear to the eye large and full, which when dreſſed will be flabby, and little elſe than ſkin and bones. But this impoſition may be diſcovered by placing the finger and thumb on each ſide of the vent, and ſqueezing it hard; the wind may be perceived to go out, the ſkin will fall in, and the fiſh appear lank, and of little value.

Breeding of FISHES may be turned to great advantage; for, beſides furniſhing the table, obliging one's friends, and raiſing money, the land will be thereby greatly improved, ſo as to yield more this way than by any other employment whatever. See *Fish-Pond, infra*; and *Breeding of Fiſh*.

Caſtration of FISH, is a method firſt practiſed by Mr Tull, in order to prevent the exceſſive increaſe of fiſh in ſome of his ponds, where the numbers did not permit any of them to grow to an advantageous ſize. But he afterwards found, that the caſtrated fiſh grew much larger than their uſual ſize, were more fat, and always in ſeaſon. This operation may be performed both on male and female fiſh; and the moſt eligible time for it is when the ovaries of the female have their ova in them, and when the veſſels of the male, analogous to theſe, have their ſeminal matter in them; becauſe, at this time, theſe veſſels are more eaſily diſtinguiſhed from the ureters, which convey the urine from the kidneys into the bladder, and are ſituated near the ſeminal veſſels on each ſide of the ſpine; which, without ſufficient attention, may be miſtaken for the ovaries, eſpecially when theſe laſt are empty. The time leaſt proper for this operation, is juſt after they have ſpawned, becauſe the fiſh are then too weak and languid to bear, with ſucceſs, ſo ſevere an operation; however, with ſkill and care, it may be performed almoſt at any time. When a fiſh is to be caſtrated, it muſt be held in a wet cloth, with its belly upwards; then with a ſharp pen-knife, having its point bent backwards, the operator cuts through the integuments of the rim of the belly, taking care not to wound any of the inteſtines. As ſoon as a ſmall aperture is made, he carefully inſerts a hooked pen-knife, and with this dilates the aperture from between the two fore-fins almoſt to the anus. He then, with two ſmall blunt ſilver-hooks, five or ſix inches long, and of this form ſ, by the help of an aſſiſtant, holds open the belly of the fiſh; and, with a ſpoon or ſpatula, removes carefully the inteſtines from one ſide. When theſe are removed, you ſee the ureter, a ſmall veſſel, nearly in the direction of the ſpine, and alſo the ovary, a larger veſſel, lying before it, nearer the integuments of the belly. This laſt veſſel is taken up with a hook of the ſame kind with thoſe before mentioned, and, after detaching it from the ſide far enough for the purpoſe, divided tranſverſely with a pair of ſharp ſciſſars, care being taken that the inteſtines are not wounded or injured. After one of the ovaries has been divided, the operator proceeds to divide the other in the ſame manner; and then the divided integuments of the belly are ſewed with ſilk, the ſtitches being inſerted at a ſmall diſtance from one another. Mr Tull obſerves farther, that the ſpawning time is very various; that trouts are full about Chriſtmas; perch in February; pikes in March, and carp and tench in May; and that allowance muſt be made for climate and ſituation, with regard to the ſpawning of fiſh. When the fiſh are caſtrated, they are put into the water where they are intended to continue; and they take their chance in common with other fiſh, as though they were not caſtrated. With tolerable care, few die of the operation. *Phil Tranſ.* vol. xlviii. Part 2. art. 106.

Fiſh.

Although we could not properly avoid inſerting the above detail, it is preſumed that few will be pleaſed with the invention. The operation is peculiarly cruel, and the purpoſe of it only a deteſtable piece of Apician refinement.

Feeding of FISHES. When they are fed in large pools or ponds, either malt boiled, or feſh grains, is the beſt food; thus carps may be raiſed and fed like capons, and tenches will feed as well. The care of feeding them is beſt committed to a gardener or the butler, who ſhould be always at hand. When fed in a ſtew, any ſort of grain boiled, eſpecially peas, and malt coarſely ground, are proper food; alſo the grains after brewing, while freſh and ſweet; but one buſhel of malt not brewed, will go as far as two of grains.

Stealing of FISH, by perſons armed and diſguiſed, is felony without benefit of clergy by 9 Geo. I. cap. 22. See *Black act*. And by 5 Geo. III. cap. 14. the penalty of tranſportation for ſeven years is inflicted on perſons ſtealing or taking fiſh in any water, within a park, paddock, orchard, or yard; and on the receivers, aiders, and abettors; and a forfeiture of five pounds to the owner of the fiſhery is made payable by perſons taking or deſtroying (or attempting ſo to do) any fiſh in any river or other water within any incloſed ground, being private property.

Preſerving of FISH *for Cabinets*. Linnæus's method is, to expoſe them to the air; and when they acquire ſuch a degree of putrefaction that the ſkin loſes its coheſion to the body of the fiſh, it may be ſlid off almoſt like a glove: the two ſides of this ſkin may then be dried upon paper like a plant, or one of the ſides may be filled with plaſter of Paris to give the ſubject a due plumpneſs. *Amen. Acad.* tom. iii.

A fiſh may be prepared, after it has acquired this degree of putrefaction, by making a longitudinal inciſion on the belly, and carefully diſſecting the fleſhy part from the ſkin, which are but ſlightly attached to it in conſequence of the putreſcency. The ſkin is then to be filled with cotton and the antiſeptic powder.

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Fiſh. as directed for birds; and, laſtly, to be ſewed up where the inciſion was made. See *Methods of Preſerving* BIRDS.

Gold-Fiſh. See CYPRINUS.

Gilding on Fiſh. In the poſthumous papers of Mr Hooke, a method is deſcribed of gilding live craw-fiſh, carps, &c. without injuring the fiſh. The cement for this purpoſe is prepared, by putting ſome burgundy-pitch into a new earthen pot, and warming the veſſel till it receives ſo much of the pitch as will ſtick round it; then ſtrewing ſome finely-powdered amber over the pitch when growing cold, adding a mixture of three pounds of linſeed oil and one of oil of turpentine, covering the veſſel, and boiling them for an hour over a gentle fire, and grinding the mixture, as it is wanted, with ſo much pumice-ſtone in fine powder as will reduce it to the conſiſtence of paint. The fiſh being wiped dry, the mixture is ſpread upon it; and the gold-leaf being then laid on, and gently preſſed down, the fiſh may be immediately put into water again, without any danger of the gold coming off, for the matter quickly grows firm in water.

FISH, in a ſhip, a plank or piece of timber, faſtened to a ſhip's maſt or yard, to ſtrengthen it; which is done by nailing it on with iron ſpikes, and winding ropes hard about them.

FISHES, in heraldry, are the emblems of ſilence and watchfulneſs; and are borne either upright, imbowed, extended, endorſed reſpecting each other, ſurmounting one another, fretted, &c.

In blazoning fiſhes, thoſe borne feeding, ſhould be termed *devouring;* all fiſhes borne upright and having fins, ſhould be blazoned *hauriant;* and thoſe borne tranſverſe the eſcutcheon, muſt be termed *naiant.*

Fish-Ponds, thoſe made for the breeding or feeding of fiſh.

Fiſh ponds are no ſmall improvement of watery and boggy lands, many of which are fit for no other uſe. In making of a pond, its head ſhould be at the loweſt part of the ground, that the trench of the flood-gate or ſluice, having a good fall, may not be too long in emptying. The beſt way of making the head ſecure, is to drive in two or three rows of ſtakes above ſix feet long, at about four feet diſtance from each other, the whole length of the pond-head, whereof the firſt roe ſhould be rammed at leaſt about four feet deep. If the bottom is falſe, the foundation may be laid with quick-lime; which ſlaking, will make it as hard as a ſtone. Some lay a layer of lime, and another of earth dug out of the pond, among the piles and ſtrakes; and when theſe are well covered, drive in others as they ſee occaſion, ramming in the earth as before, till the pond-head be of the height deſigned.

The dam ſhould be made ſloping on each ſide, leaving a waſte to carry off the over-abundance of water in times of floods or rains; and as to the depth of the pond, the deepeſt part need not exceed ſix feet, riſing gradually in ſhoals towards the ſides, for the fiſh to ſun themſelves, and lay their ſpawn. Gravelly and ſandy bottoms, eſpecially the latter, are beſt for breeding; and a fat ſoil with a white fat water, as the waſhings of hills, commons, ſtreets, ſinks, &c. is beſt for fattening all ſorts of fiſh. For ſtoring a pond, carp is to be preferred for its goodneſs, quick growth, and great increaſe, as breeding five or ſix times a-year. A pond of an acre, if it be a feeding and not breeding one, will every year feed 200 carps of three years old, 300 of two years old, and 400 of a year old. Carps delight in ponds that have marle or clay bottoms, with plenty of weeds and graſs, whereon they feed in the hot months. Fiſher.

Ponds ſhould be drained every three or four years, and the fiſh ſorted. In breeding ones, the ſmaller ones are to be taken out, to ſtore other ponds with; leaving a good ſtock of females, at leaſt eight or nine years old, as they never breed before that age. In feeding ponds, it is beſt to keep them pretty near of a ſize. See *Breeding of Fiſh.*

FISHER (John), biſhop of Rocheſter, was born at Beverly in Yorkſhire, in the year 1459, and educated in the collegiate church of that place. In 1484, he removed to Michael-houſe in Cambridge, of which college he was elected maſter in the year 1495. Having applied himſelf to the ſtudy of divinity, he took orders; and, becoming eminent as a divine, attracted the notice of Margaret counteſs of Richmond, mother of Henry VII. who made him her chaplain and confeſſor. In 1501, he took the degree of doctor of divinity, and the ſame year was elected chancellor of the univerſity. In the year following, he was appointed Lady Margaret's firſt divinity-profeſſor; and, in 1504, conſecrated biſhop of Rocheſter; which ſmall biſhopric he would never reſign, though he was offered both Ely and Lincoln. It is generally allowed, that the foundation of the two colleges of Chriſt-church and St John's, in Cambridge, was entirely owing to biſhop Fiſher's perſuaſion, and influence with the counteſs of Richmond: he not only formed the deſign, but ſuperintended the execution. On the promulgation of Martin Luther's doctrine, our biſhop was the firſt to enter the liſts againſt him. On this occaſion he exerted all his influence, and is generally ſuppoſed to have written the famous book by which Henry VIII. obtained the title of *Defender of the Faith.* Hitherto he continued in favour with the king; but in 1527, oppoſing his divorce, and denying his ſupremacy, the implacable Harry determined, and finally effected, his deſtruction. In 1534, the parliament found him guilty of miſpriſion of treaſon, for concealing certain prophetic ſpeeches of a fanatical impoſtor, called the *Holy Maid of Kent*, relative to the king's death; and condemned him, with five others, in loſs of goods, and impriſonment during his majeſty's pleaſure; but he was releaſed on paying 300 l. for the king's uſe.

King Henry being now married to Anne Boleyn, his obſequious parliament took an oath of allegiance proper for the occaſion. This oath the biſhop of Rocheſter ſteadily refuſed; alleging, that his conſcience could not be convinced that the king's firſt marriage was againſt the law of God. For refuſing this oath of ſucceſſion, he was attainted by the parliament of 1534; and committed to the Tower, where he was cruelly treated, and where he would probably have died a natural death, had not the pope created him a cardinal. The king, now poſitively determined on his deſtruction, ſent Rich, the ſolicitor-general, under a pretence of conſulting the biſhop on a caſe of conſcience, but really with a deſign to draw him into a converſation concerning the ſupremacy. The honeſt old biſhop ſpoke his mind without ſuſpicion or reſerve, and

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Fishery. an indictment and conviction of high-treason was the consequence. He was beheaded on Tower-hill, on the 22d of June 1535, in the 77th year of his age. Thus died this good old prelate; who, notwithstanding his inflexible enmity to the reformation, was undoubtedly a learned, pious, and honest man. He wrote several treatises against Luther, and other works, which were printed at Wurtzburgh, in 1597, in one volume folio. Fishery.

FISHERY, a place where great numbers of fish are caught.

The principal fisheries for salmon, herring, mackrel, pilchards, &c. are along the coasts of Scotland, England, and Ireland; for cod, on the banks of Newfoundland; for whales, about Greenland; and for pearls, in the East and West Indies.

Free FISHERY, in law, or an exclusive right of fishing in a public river, is a royal franchise; and is considered as such in all countries where the feodal polity has prevailed: though the making such grants, and by that means appropriating, what it seems unnatural to restrain, the use of running water, was prohibited for the future by king John's Great Charter; and the rivers that were fenced in his time were directed to be laid open, as well as the forests to be disforested. This opening was extended by the second and third charters of Henry III. to those also that were fenced under Richard I.; so that a franchise of free fishery ought now to be as old at least as the reign of Henry II. This differs from a *several of piscary*, because he that has a several fishery must also be the owner of the soil, which in a free-fishery is not requisite. It differs also from a *common* fishery, in that the free fishery is an exclusive right, the common fishery is not so: and therefore, in a free fishery, a man has a property in the fish before they are caught; in a common piscary, not till afterwards. Some indeed have considered a *free* fishery not as a royal franchise; but merely as a private grant of a liberty to fish in the *several* fishery of the granter. But the considering such right as originally a flower of the prerogative, till restrained by Magna Charta, and derived by royal grant (previous to the reign of Richard I.) to such as now claim it by prescription, may remove some difficulties in respect to this matter with which our law-books are embarrassed. *Blackst. Comment.*

FISHERY, denotes also the commerce of fish, more particularly the catching them for sale.

Were we to enter into a very minute and particular consideration of fisheries, as at present established in this kingdom, this article would swell beyond its proper bounds; because, to do justice to a subject of such concernment to the British nation, requires a very ample and distinct discussion. We shall, however, observe, that since the Divine Providence hath so eminently stored the coasts of Great Britain and Ireland with the most valuable fish; and since fisheries, if successful, become permanent nurseries for breeding expert seamen; it is not only a duty we owe to the Supreme Being, not to despise the wonderful plenty he hath afforded us, by neglecting to extend this branch of commerce to the utmost; but it is a duty we owe to our country, for its natural security, which depends upon the strength of our royal navy. No nation can have a navy where there is not a fund of business to breed and employ seamen without any expence to the public; and no trade is so well calculated for training up these useful members of society as fisheries. Fishery.

The situation of the British coasts is the most advantageous in the world for catching fish: the Scottish islands, particularly those to the north and west, lie most commodious for carrying on the fishing trade to perfection; for no country in Europe can pretend to come up to Scotland in the abundance of the finest fish, with which its various creeks, bays, rivers, lakes, and coasts are replenished. Of these advantages, the Scots seem indeed to have been abundantly sensible; and their traffic in herrings, the most valuable of all the fisheries, is noticed in history so early as the ninth century*. The frequent laws which were enacted in the reigns of James III. IV. and V. discover a steady determined zeal for the benefit of the native subjects, and the full restoration of the fisheries, which the Dutch had latterly found means to engross, and do honour to the memory of those patriots whom modern times affect to call barbarians. * See art. 4. *infra.*

The expedition of James V. to the Hebrides and western parts of the Highlands, and his assiduity in exploring and sounding the harbours, discovered a fixed resolution in that active prince, to civilize the inhabitants, to promote the valuable fisheries at their doors, and to introduce general industry. His death, at an early period, and the subsequent religious and civil commotions in the kingdom, frustrated those wise designs, and the western fisheries remained in their original state of neglect. At length, 1602, James VI. resumed the national purposes which had been thus chalked out by his grandfather. "Three towns, (says Dr Robertson) which might serve as a retreat for the industrious, and a nursery for arts and commerce, were appointed to be built in different parts of the Highlands; one in Cantire, another in Lochaber, and a third in the isle of Lewis; and in order to draw the inhabitants thither, all the privileges of the royal boroughs were to be conferred upon them. Finding it, however, to be no easy matter to inspire the inhabitants of those countries with the love of industry, a resolution was taken to plant among them colonies of people from the more industrious countries. The first experiment was made in the isle of Lewis; and as it was advantageously situated for the fishing trade (a source from which Scotland ought naturally to derive great wealth), the colony transported thither was drawn out of Fife, the inhabitants of which were well skilled in that branch of commerce. But before they had remained there long enough to manifest the good effects of this institution, the islanders, enraged at seeing their country occupied by those intruders, took arms, and surprising them in the night-time, murdered some of them, and compelled the rest to abandon the settlement. The king's attention being soon turned to other objects, particularly to his succession to the English crown, we hear no more of this salutary project."

The Scottish fisheries were, however, resumed by Charles I. who "ordained an association of the three kingdoms, for a general fishing within the haill seas and coasts of his majesty's said kingdoms; and for the government of the said association, ordained, that there should be a standing committee chosen and nominated by his majesty, and his successors from time

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Fishery. to time," &c. &c. Several persons of distinction embarked in the design, which the king honoured with his patronage, and encouraged by his bounty. He also ordered lent to be more strictly observed; prohibited the importation of fish taken by foreigners; and agreed to purchase from the company his naval stores and the fish for his fleets. Thus the scheme of establishing a fishery in the Hebrides began to assume a favourable aspect; but all the hopes of the adventurers were frustrated by the breaking out of the civil wars, and the very tragical death of their benefactor.

In 1661, Charles II. duke of York, lord Clarendon, and other persons of rank or fortune, resumed the business of the fisheries with greater vigour than any of their predecessors. For this purpose the most salutary laws were enacted by the parliaments of England and Scotland; in virtue of which, all materials used in, or depending upon, the fisheries, were exempted from all duties, excises, or imposts whatever. In England, the company were authorised to set up a lottery, and to have a voluntary collection in all parish churches; houses of entertainment, as taverns, inns, ale-houses, were to take one or more barrels of herrings, at the stated price of 30 s. per barrel; also 2 s. 6 d. per barrel was to be paid to the stock of this company on all imported fish taken by foreigners. Some Dutch families were also invited, or permitted, to settle at Stornaway: the herrings cured by the royal English company gave general satisfaction, and, as mentioned above, brought a high price for those days. Every circumstance attending this new establishment seemed to be the result of a judicious plan and thorough knowledge of the business, when the necessities of the king obliged him to withdraw his subscription or bounty; which gave such umbrage to the parties concerned, that they soon after dissolved.

In 1677, a new royal company was established in England, at the head of which was the duke of York, the earl of Derby, &c. Besides all the privileges which former companies had enjoyed, the king granted this new company a perpetuity, with power to purchase lands; and also L. 20 to be paid them annually, out of the customs of the port of London, for every dogger or buss they should build and send out for seven years to come. A stock of L. 10,980 was immediately advanced, and afterwards L. 1600 more. This small capital was soon exhausted in purchasing and fitting out busses, with other incidental expences. The company made, however, a successful beginning; and one of their busses or doggers actually took and brought home 32,000 cod-fish; other vessels had also a favourable fishery. Such favourable beginnings might have excited fresh subscriptions, when an unforeseen event ruined the whole design beyond the possibility of recovery. Most of the busses had been built in Holland, and manned with Dutchmen; on which pretence the French, who were then at war with Holland, seized six out of seven vessels, with their cargoes and fishing-tackle; and the company being now in debt, sold, in 1680, the remaining stores, &c. A number of gentlemen and merchants raised a new subscription of L. 60,000, under the privileges and immunities of the former charter. This attempt also came to nothing, owing to the death of the king, and the troubles of the subsequent reign.

Soon after the revolution this business was again resumed, and upon a more extensive scale; the proposed capital being 300,000 l. of which 100,000 l. was to have been raised by the surviving patentees or their successors, and 200,000 l. by new subscribers. Copies of the letters patent, the constitution of the company, and terms of subscription, were lodged at sundry places in London and Westminster, for the perusal of the public, while the subscription was filling. It is probable, that king William's partiality to the Dutch fisheries, the succeeding war, or both of these circumstances, frustrated this new attempt; of which we have no further account in the annals of that reign or since. Fishery.

The Scottish parliament had also, during the three last reigns, passed sundry acts for erecting companies and promoting the fisheries; but the intestine commotions of that country, and the great exertions which were made for the Darien establishment, enfeebled all other attempts, whether collectively or by individuals, within that kingdom.

In 1749, his late majesty having, at the opening of the parliament, warmly recommended the improvement of the fisheries, the house of commons appointed a committee to inquire into the state of the herring and white fisheries, and to consider of the most probable means of extending the same. All ranks of men were elevated with an idea of the boundless riches that would flow into the kindom from this source. A subscription of 500,000 l. was immediately filled in the city, by a body of men who were incorporated for 21 years by the name of *The Society of the Free British Fishery*. Every encouragement was held out by government, both to the society and to individuals, who might embark in this national business. A bounty of 36 s. *per* ton was to be paid annually out of the customs, for 14 years, to the owners of all decked vessels or busses, from 20 to 80 tons burden, which should be built after the commencement of the act, for the use of, and fitted out and employed in, the said fisheries, whether by the society or any other persons. At the same time numerous pamphlets and newspaper-essays came forth; all pretending to elucidate the subject, and to convince the public with what facility the herring fisheries might be transferred from Dutch to British hands. This proved, however, a more arduous task than had been foreseen by superficial speculators. The Dutch were frugal in their expenditures and living; perfect masters of the arts of fishing and curing, which they had carried to the greatest height and perfection. They were in full possession of the European markets; and their fish, whether deserving or otherwise, had the reputation of superior qualities to all others taken in our seas. With such advantages, the Dutch not only maintained their ground against this formidable company, but had also the pleasure of seeing the capital gradually sinking, without having procured an adequate return to the adventurers; notwithstanding various aids and efforts of government from time to time in their favour, particularly in 1757, when an advance of 20 s. *per* ton was added to the bounty.

In 1786 the public attention was again called to the state of the British fisheries, by the suggestions of Mr Dempster in the house of commons, and by different publications that appeared upon the subject: in consequence of which, the minister suffered a committee to be named, to inquire into this great source of national wealth. To that

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Fiſhery. that committee it appeared, that the beſt way of improving the fiſheries was to encourage the inhabitants living neareſt to the ſeat of them to become fiſhers: And it being found that the north-weſtern coaſt of the kingdom, though abounding with fiſh and with fine harbours, was utterly deſtitute of towns, an act was paſſed for incorporating certain perſons therein named, by the ſtyle of "*The Britiſh Society* for extending of the fiſheries and improving the ſea-coaſts of this kingdom;" and to enable them to ſubſcribe a joint ſtock, and therewith to purchaſe lands, and build thereon free towns, villages, and fiſhing ſtations in the Highlands and iſlands in that part of Great Britain called Scotland, and for other purpoſes. The Iſle of Mull, Loch-Broom, the Iſle of Sky and of Cannay, have already been pitched upon as proper ſituations for ſome of theſe towns. The progreſs of ſuch an undertaking from its nature muſt be ſlow, but ſtill ſlower when carried on with a limited capital ariſing from the ſubſcriptions of a few public-ſpirited individuals. But it is not to be doubted but that it will ultimately tend to the increaſe of our fiſheries, and to the improvement of the Highland part of this kingdom. Its tendency is alſo to leſſen the emigration of a brave and induſtrious race of inhabitants, too many of whom have already removed with their families to America.

1. *Anchovy-Fisherr.* The anchovy is caught in the months of May, June, and July, on the coaſts of Catalonia, Provence, &c. at which ſeaſon it conſtantly repairs up the ſtraits of Gibraltar, into the Mediterranean. Collins ſays they are alſo found in plenty on the weſtern coaſts of England and Wales.

The fiſhing for them is chiefly in the night-time; when a light being put on the ſtern of their little fiſhing-veſſels, the anchovies flock round, and are caught in the nets. But then it is aſſerted to have been found by experience, that anchovies taken thus by fire, are neither ſo good, ſo firm, nor ſo proper for keeping, as thoſe which are taken without fire.

When the fiſhery is over, they cut off the heads, take out their gall and guts, and then lay them in barrels, and ſalt them. The common way of eating anchovies is with oil, vinegar, &c. in order to which they are firſt boned, and the tails, fins, &c. ſlipped off.—Being put on the fire, they diſſolve almoſt in any liquor. Or they are made into ſauce by minching them with pepper, &c. Some alſo pickle anchovies in ſmall delft or earthen pots, made on purpoſe, of two or three pound weight, more or leſs, which they cover with plaſter to keep them the better. Anchovies ſhould be choſen ſmall, freſh pickled, white on the outſide and red within. They muſt have a round back; for thoſe which are flat or large are often nothing but ſardines. Beſide theſe qualities, the pickle, on opening the pots or barrels, muſt be of a good taſte, and not have loſt its flavour.

2. *Cod Fisherr.* There are two kinds of cod-fiſh; the one green or white cod, and the other dried or cured cod; though it is all the ſame fiſh *, differently prepared; the former being ſometimes ſalted and barrelled, then taken out for uſe; and the latter, having lain ſome competent time in ſalt, dried in the ſun or ſmoke. We ſhall therefore ſpeak of each of theſe apart; and firſt of the

* See *Gadus.*

Green. The chief fiſheries for green cod are in the bay of Canada, on the great bank of Newfoundland, and on the iſle of St Peter, and the iſle of Sable; to which places veſſels reſort from divers parts both of Europe and America. They are from 100 to 150 tons burden, and will catch between 30,000 and 40,000 cod each. The moſt eſſential part of the fiſhery is, to have a maſter who knows how to cut up the cod, one who is ſkilled to take off the head properly, and above all a good ſalter, on which the preſerving of them, and conſequently the ſucceſs of the voyage, depends. The beſt ſeaſon is from the beginning of February to the end of April; the fiſh, which in the winter retire to the deepeſt water, coming then on the banks, and fattening extremely. What is caught from March to June keeps well; but thoſe taken in July, Auguſt, and September, when it is warm on the banks, are apt to ſpoil ſoon. Every fiſher takes but one at a time: the moſt expert will take from 350 to 400 in a day; but that is the moſt, the weight of the fiſh and the great coldneſs on the bank fatiguing very much. As ſoon as the cod are caught, the head is taken off; they are opened, gutted, and ſalted; and the ſalter ſtows them in the bottom of the hold, head to tail, in beds a fathom or two ſquare; laying layers of ſalt and fiſh alternately, but never mixing fiſh caught on different days. When they have lain thus three or four days to drain off the water, they are replaced in another part of the ſhip, and ſalted again; where they remain till the veſſel is loaded. Sometimes they are cut in thick pieces, and put in barrels for the conveniency of carriage.

Dry. The principal fiſhery for this article is, from Cape Roſe to the Bay des Exports, along the coaſt of Placentia, in which compaſs there are divers commodious ports for the fiſh to be dried in. Theſe, though of the ſame kind with the freſh cod, are much ſmaller, and therefore fitter to keep, as the ſalt penetrates more eaſily into them. The fiſhery of both is much alike; only this latter is moſt expenſive, as it takes up more time, and employs more hands, and yet ſcarce half ſo much ſalt is ſpent in this as in the other. The bait is herrings, of which great quantities are taken on the coaſt of Placentia. When ſeveral veſſels meet and intend to fiſh in the ſame port, he whoſe ſhallop firſt touches ground, becomes intitled to the quality and privileges of admiral: he has the choice of his ſtation, and the refuſal of all the wood on the coaſt at his arrival. As faſt as the maſters arrive, they unrig all their veſſels, leaving nothing but the ſhrouds to ſuſtain the maſts; and in the mean time the mates provide a tent on ſhore, covered with branches of trees, and ſails over them, with a ſcaffold of great trunks of pines, 12, 15, 16, and often 20 feet high, commonly from 40 to 60 feet long, and about one-third as much in breadth. While the ſcaffold is preparing, the crew are a-fiſhing; and as faſt as they catch, they bring their fiſh aſhore, and open and ſalt them upon moveable benches; but the main ſalting is performed on the ſcaffold. When the fiſh have taken ſalt, they waſh and hang them to drain on rails; when drained, they are laid on kinds of ſtages, which are ſmall pieces of wood laid acroſs, and covered with branches of trees, having the leaves ſtripped off for the paſſage of the air. On theſe ſtages, they are diſpoſed, a fiſh thick, head againſt tail, with the back uppermoſt, and are turned carefully four

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Fiſhery.

four times every 24 hours. When they begin to dry, they are laid in heaps 10 or 12 thick, in order to retain their warmth; and every day the heaps are enlarged, till they become double their firſt bulk; then two heaps are joined together, which they turn every day as before: laſtly, they are ſalted again, beginning with thoſe firſt ſalted; and being laid in huge piles, they remain in that ſituation till they are carried on board the ſhips where they are laid on the branches of trees diſpoſed for that purpoſe, upon the ballaſt, and round the ſhip, with mats to prevent their contracting any moiſture.

There are four kinds of commodities drawn from cod, viz. the zounds, the tongues, the roes, and the oil extracted from the liver. The firſt is ſalted at the fiſhery, together with the fiſh, and put in barrels from 600 to 700 pound. The tongues are done in like manner, and brought in barrels from 400 to 500 pounds. The roes are alſo ſalted in barrels, and ſerve to caſt into the ſea to draw fiſh together, and particularly pilchards. The oil comes in barrels, from 400 to 520 pounds, and is uſed in dreſſing leather. In Scotland, they catch a ſmall kind of cod on the coaſts of Buchan, and all along the Murray frith on both ſides; as alſo in the frith of Forth, Clyde, &c. which is much eſteemed. They ſalt and dry them in the ſun upon rocks, and ſometimes in the chimney.

3. *Coral-Fisherr.* See Coral.

4. *Herring-Fisherr.* Our great ſtations for this fiſhery are off the Shetland and Weſtern Iſles, and off the coaſt of Norfolk, in which the Dutch alſo ſhare *. There are two ſeaſons for fiſhing herring: the firſt from June to the end of Auguſt; and the ſecond in Autumn, when the fogs become very favourable for this kind of fiſhing. The Dutch begin their herring-fiſhing on the 24th of June, and employ a vaſt number of veſſels therein; called *buſſes*, being between 45 and 60 tons burden each, and carrying three or four ſmall cannon. They never ſtir out of port without a convoy, unleſs there be enough together to make about 18 or 20 cannon among them, in which caſe they are allowed to go in company. Before they go out, they make a verbal agreement, which has the ſame force as if it were in writing. The regulations of the admiralty of Holland are partly followed by the French and other nations, and partly improved and augmented with new ones; as, that no fiſher ſhall caſt his net within 100 fathoms of another boat: that while the nets are caſt, a light ſhall be kept on the hind-part of the veſſel: that when a boat is by any accident obliged to leave off fiſhing, the light ſhall be caſt into the ſea: that when the greater part of a fleet leaves off fiſhing, and caſts anchor, the reſt ſhall do the ſame, &c.

* See the article *Clupea*.

Mr Anderſon † gives to the Scots a knowledge of great antiquity in the herring-fiſhery. He ſays that the Netherlanders reſorted to theſe coaſts as early as A. D. 836, to purchaſe ſalted fiſh of the natives; but, impoſing on the ſtrangers, they learned the art, and took up the trade, in after-times of ſuch immenſe emolument to the Dutch.

† *Hiſt. of Commerce.*

Sir Walter Raleigh's obſervations on that head, extracted from the ſame author, are extremely worthy the attention of the curious, and excite reflections on the vaſt ſtrength reſulting from the wiſdom of well applied induſtry.

In 1603, he remarks the Dutch ſold to different nations, as many herrings as amounted to L. 1,759,000 Sterling. In the year 1615, they at once ſent out 2000 buſſes, and employed in them 37,000 fiſhermen. In the year 1618, they ſent out 3000 ſhips, with 56,000 men to take the herrings, and 9000 more ſhips to tranſport and ſell the fiſh; which by ſea and land employed 150,000 men, beſides thoſe firſt mentioned. All this wealth was gotten on our coaſts; while our attention was taken up in a diſtant whale-fiſhery. Fiſhery.

The Scottiſh monarchs for a long time ſeemed to direct all their attention to the preſervation of the ſalmon fiſhery; probably becauſe their ſubjects were ſuch novices in ſea-affairs. At length James III. endeavoured to ſtimulate his great men to theſe patriotic undertakings; for by an act of his third parliament, he compelled "certain lords ſpiritual and temporal, and burrows, to make ſhips, buſſes, and boats, with nets, and other pertinents, for fiſhing. That the ſame ſhould be made in each burgh; in number according to the ſubſtance of each burgh, and the leaſt of them to be of twenty tons: and that all idle men be compelled by the ſheriffs in the country to go on board the ſame."

Numerous indeed have been the attempts made at different periods to ſecure this treaſure to ourſelves, but without ſucceſs. In the late reign, a very ſtrong effort was made, and bounties allowed for the encouragement of Britiſh adventurers: the firſt was of 30s. *per* ton to every buſs of 70 tons and upwards. This bounty was afterwards raiſed to 50 s. *per* ton, to be paid to ſuch adventurers as were intitled to it by claiming it at the places of rendezvous. The buſſes are from 20 to 90 tons burden, but the beſt ſize is 80. A veſſel of 80 tons ought to take ten laſts, or 120 barrels of herrings, to clear expences, the price of the fiſh to be admitted to be a guinea a barrel. A ſhip of this ſize ought to have 18 men, and three boats: one of 20 tons ſhould have ſix men; and every five tons above, require an additional hand. To every ton are 280 yards of nets; ſo a veſſel of 80 tons carries 20,000 ſquare yards: each net is 12 yards long, and 10 deep; and every boat takes out from 20 to 30 nets, and puts them together, ſo as to form a long train; they are ſunk at each end of the train by a ſtone, which weighs it down to the full extent: the top is ſupported by buoys, made of ſheeps-ſkin, with a hollow ſtick at the mouth, faſtened tight; through this the ſkin is blown up, and then ſtopped with a peg, to prevent the eſcape of the air. Sometimes theſe buoys are placed at the top of the nets; at other times the nets are ſuffered to ſink deeper, by the lengthening the cords faſtened to them, every cord being for that purpoſe 10 or 12 fathoms long. But the beſt fiſheries are generally in more ſhallow water.

Of the Scots fiſhery in the Weſtern Iſles, the following account is given by Mr Pennant *. "The fiſhing is always perfomed in the night, unleſs by accident. The buſſes remain at anchor, and ſend out their boats a little before ſun-ſet; which continue out, in winter and ſummer, till day-light; often taking up and emptying their nets, which they do 10 or 12 times in a night, in caſe of good ſucceſs. During winter it is a moſt dangerous and fatiguing employ, by reaſon of the greatneſs and frequency of the gales in theſe ſeas, and in ſuch gales are the moſt ſucceſsful captures: but, by the Providence of heaven, the fiſhers are ſeldom loſt; and, what is wonderful, *Voyage to the Hebrides.*

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Fishery. derful, few are visited with illness. They go out well prepared, with a warm great coat, boots, and skin aprons, and a good provision of beef and spirits. The same good fortune attends the busses, which in the tempestuous season, and in the darkest nights, are continually shifting, in these narrow seas, from harbour to harbour. Sometimes 80 barrels of herrings are taken in a night by the boats of a single vessel. It once happened, in Loch-Slappan, in Skie, that a buss of 80 tons might have taken 200 barrels in one night, with 10,000 square yards of net; but the master was obliged to desist, for want of a sufficient number of hands to preserve the capture. The herrings are preserved by salting, after the entrails are taken out. This last is an operation performed by the country-people, who get three-halfpence per barrel for their trouble; and sometimes, even in the winter, can gain fifteen pence a-day. This employs both women and children; but the salting is only entrusted to the crew of the busses. The fish are laid on their backs in the barrels, and layers of salt between them. The entrails are not lost, for they are boiled into an oil: 8000 fish will yield ten gallons, valued at one shilling the gallon. A vessel of 80 tons takes out 144 barrels of salt; a drawback of 2s. 8d. is allowed for each barrel used by the foreign or Irish exportation of the fish; but there is a duty of 1s. per barrel for the home-consumption, and the same for those sent to Ireland. The barrels are made of oak-staves, chiefly from Virginia; the hoops from several parts of our own island, and are either of oak, birch, hazel, or willow: the last from Holland, liable to a duty. The barrels cost about 3s. each, they hold from 500 to 800 fish, according to the size of the fish; and are made to contain 32 gallons. The barrels are inspected by proper officers: a cooper examines if they are statutable and good; if faulty, he destroys them, and obliges the maker to stand to the loss.

"Loch-Broom has been celebrated for three or four centuries as the resort of herrings. They generally appear here in July; those that turn into this bay are part of the brigade that detaches itself from the western column of that great army which annually deserts the vast depths of the arctic circle, and come, heaven-directed, to the seats of population, offered as a cheap food to millions, whom wasteful luxury or iron-hearted avarice hath deprived, by enhancing the price of the wonted supports of the poor. The migration of these fish from their northern retreat is regular; their visits to the Western isles and coasts, certain; but their attachment to one particular loch, extremely precarious. All have their turns: that which swarmed with fish one year, is totally deserted the following; yet the next loch to it may be crowded with the shoals. These changes of place give often full employ to the busses, who are continually shifting their harbour in quest of news respecting these important wanderers. They commonly appear here in July; the latter end of August they go into deep water, and continue there for some time, without any apparent cause: in November, they return to the shallows, when a new fishery commences, which continues till January; at that time the herrings become full of roe, and are useless as articles of commerce. Some doubt, whether those herrings that appear in November are not part of a new migration; for they are as fat, and make the same appearance, as those that composed the first. The signs of the arrival of the herrings are flocks of gulls, who catch up the fish while they skim on the surface; and of gannets, who plunge and bring them up from considerable depths. Both these birds are closely attended to by the fishers. Cod-fish, haddocks, and dog-fish, follow the herrings in vast multitudes; these voracious fish keep on the outsides of the columns, and may be a concurrent reason of driving the shoals into bays and creeks. In summer, they come into the bays generally with the warmest weather, and with easy gales. During winter, the hard gales from north-west are supposed to assist in forcing them into shelter. East winds are very unfavourable to the fishery."

Herrings are cured either white or pickled, or red.

Of the *first*, those done by the Dutch are the most esteemed, being distinguished into four sorts, according to their sizes; and the best are those that are fat, fleshy, firm, and white, salted the same day they are taken, with good salt, and well barrelled. The British cured herrings are little inferior, if not equal, to the Dutch; for in spite of all their endeavours to conceal the secret, their method of curing, lasting, or casking the herrings, has been discovered, and is as follows. After they have hauled in their nets, which they drag in the stern of their vessels backwards and forwards in traversing the coast, they throw them upon the ship's deck, which is cleared of every thing for that purpose: the crew is separated into sundry divisions, and each division has a peculiar task; one part opens and guts the herrings, leaving the melts and roes; another cures and salts them, by lining or rubbing their inside with salt; the next packs them, and between each row and division they sprinkle handfuls of salt; lastly, the cooper puts the finishing hand to all, by heading the casks very tight, and stowing them in the hold.

Red herrings must lie 24 hours in the brine, in as much as they are to take all their salt there; and when they are taken out, they are spitted, that is, strung by the head on little wooden spits, and then hung in a chimney made for that purpose. After which, a fire of brush-wood, which yields a deal of smoke but no flame, being made under them, they remain there till sufficiently smoked and dried, and are afterwards barrelled up for keeping.

5. *Lobster**-*Fishery*. Lobsters are taken along the British channel, and on the coast of Norway, whence they are brought to London for sale; and also in the frith of Edinburgh, and on the coast of Northumberland. By 10 and 11 W. III. cap. 24. no lobster is to be taken under eight inches in length, from the peak of the nose to the end of the middle fin of the tail; and by 9 G. II. cap 33. no lobsters are to be taken on the coast of Scotland from the first of June to the first of September. * See Cancer.

6. *Mackrel*†-*Fishery*. The mackrel is a summer fish of passage, found in large shoals, in divers parts of the ocean, not far north; but especially on the French and English coasts. The fishing is usually in the months of April, May, and June, and even July, according to the place. They enter the English chan- † See Scomber.

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Fiſhery. nel in April, and proceed up to the ſtraits of Dover as the ſummer advances; ſo that by June they are on the coaſts of Cornwall, Suſſex, Normandy, Picardy, &c. where the fiſhery is moſt conſiderable. They are an excellent food freſh; and not to be deſpiſed, when well prepared, pickled, and put up in barrels; a method of preſerving them chiefly uſed in Cornwall.

The fiſh is taken two ways; either with a line or nets: the latter is the more conſiderable, and is uſually performed in the night-time. The rules obſerved in the fiſhing for mackrel are much the ſame as thoſe already mentioned in the fiſhery of herrings.

There are two ways of pickling them: the firſt is, by opening and gutting them, and filling the belly with ſalt, crammed in as hard as poſſible with a ſtick; which done, they range them in ſtrata or rows, at the bottom of the veſſel, ſtrewing ſalt between the layers. In the ſecond way, they put them immediately into tubs full of brine, made of freſh water and ſalt; and leave them to ſteep, till they have imbibed ſalt enough to make them keep; after which, they are taken out, and barrelled up, taking care to preſs them cloſe down.

Mackrel are not cured or exported as merchandize except a few by the Yarmouth and Leoſtoff merchants, but are generally conſumed at home; eſpecially in the city of London, and the ſea-ports between the Thames and Yarmouth, eaſt, and the Land's end of Cornwall weſt.

See Oſtrea. 7. *Oyſter*‡ *Fishery*. This fiſhery is principally carried on at Colcheſter in Eſſex; Feverſham and Milton in Kent; the Iſle of Wight; the Swales of the Medway; and Tenby on the coaſt of Wales. From Feverſham, and adjacent parts, the Dutch have ſometimes loaded a hundred large hoys with oyſters in a year. They are alſo taken in great quantities near Portſmouth, and in all the creeks and rivers between Southampton and Chicheſter: many of which are carried about by ſea to London and to Colcheſter, to be fed in the pits about Wavenhoe and other places.

8. *Pearl-Fishery*. See Pearl.

9. *Pilchard Fishery*. The chief pilchard fiſheries are along the coaſts of Dalmatia, on the coaſt of Bretagne, and along the coaſts of Cornwall and Devonſhire. That of Dalmatia is very plentiful: that on the coaſts of Bretagne employs annually about 300 ſhips. Of the pilchard fiſhery on the coaſt of Cornwall the following account is given by Dr Borlaſe: "It employs a great number of men on the ſea, training them thereby to naval affairs; employs men, women, and children, at land, in ſalting, preſſing, waſhing, and cleaning; in making boats, nets, ropes, caſks, and all the trades depending on their conſtruction and ſale. The poor are fed with the offals of the captures, the land with the refuſe of the fiſh and ſalt; the merchant finds the gains of commiſſion and honeſt commerce, the fiſherman the gains of the fiſh. Ships are often freighted hither with ſalt, and into foreign countries with the fiſh, carrying off at the ſame time part of our tin. The uſual produce of the great number of hogſheads exported each year for ten years from 1747 to 1756 incluſive, from the four ports of Fowy, Falmouth, Penzance, and St Ives, it appears that Fowy has exported yearly 1732 hogſheads; Falmouth, 14,631 hogſheads and two thirds: Penzance and Mounts-Bay 12,149 hogſheads and one third; St Ives, 1282 hogſheads: in all amounting to 29,795 hogſheads. Every hogſhead for ten years laſt paſt, together with the bounty allowed for each hogſhead exported, and the oil made out of each hogſhead, has amounted, one year with another at an average, to the price of 1 l. 13s. 3d.; ſo that the caſh paid for pilchards exported has, at a medium, annually amounted to the ſum of 49,532 l. 10 s."—The numbers that are taken at one ſhooting out of the nets are amazingly great. Mr Pennant ſays, that Dr Borlaſe aſſured him, that on the 5th of October 1767, there were at one time incloſed in St Ives's Bay 7000 hogſheads, each hogſhead containing 35,000 fiſh, in all 245 millions. Fiſhery.

The pilchards naturally follow the light, which contributes much to the facility of the fiſhery: the ſeaſon is from June to September. On the coaſts of France they make uſe of the roes of the cod-fiſh as a bait; which, thrown into the ſea, makes them riſe from the bottom, and run into the nets. On our coaſts there are perſons poſted aſhore, who, ſpying by the colour of the water where the ſhoals are, make ſigns to the boats to go among them to caſt their nets. When taken, they are brought on ſhore to a warehouſe, where they are laid up in broad piles, ſupported with backs and ſides; and as they are piled, they ſalt them with bay-ſalt; in which lying to ſoak for 30 or 40 days, they run out a deal of blood, with dirty pickle and bittern: then they waſh them clean in ſea-water; and, when dry, barrel and preſs them hard down to ſqueeze out the oil, which iſſues out at a hole in the bottom of the caſk.

10. *Salmon**-*Fishery*. The chief ſalmon fiſheries in Europe are in England, Scotland, and Ireland, in the rivers, and ſea-coaſts adjoining to the river-mouths. The moſt diſtinguiſhed for ſalmon in Scotland are, the river Tweed, the Clyde, the Tay, the Dee, the Don, the Spey, the Neſs, the Bewly, &c. in moſt of which it is very common, about the height of ſummer, eſpecially if the weather happens to be very hot, to catch four or five ſcore ſalmon at a draught. The chief rivers in England for ſalmon are, the Tyne, the Trent, the Severn, and the Thames. The fiſhing is performed with nets, and ſometimes with a kind of locks or weirs made on purpoſe, which in certain places have iron or wooden grates ſo diſpoſed, in an angle, that being impelled by any force in a contrary direction to the courſe of the river, they may give way and open a little at the point of contact, and immediately ſhut again, cloſing the angle. The ſalmon, therefore, coming up into the rivers, are admitted into theſe grates, which open, and ſuffer them to paſs through, but ſhut again, and prevent their return. The ſalmon is alſo caught with a ſpear, which they dart into him when they ſee him ſwimming near the ſurface of the water. It is cuſtomary likewiſe to catch them with a candle and lanthorn, or wiſp of ſtraw ſet on fire; for the fiſh naturally following the light, are ſtruck with the ſpear, or taken in a net ſpread for that purpoſe, and lifted with a ſudden jerk from the bottom. * See Salmo.

"The capture of ſalmon in the Tweed, about the month of July (ſays Mr Pennant†) is prodigious. In a good fiſhery, often a boat-load, and ſometimes near two, are taken in a tide: ſome few years ago there were † *Brit. Zool.* iii. 289.

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Fiſhery.

above 700 fiſh taken at one hawl, but from 50 to 100 is very frequent. The coopers in Berwick then begin to ſalt both ſalmon and gilſes in pipes and other large veſſels, and afterwards barrel them to ſend abroad, having then far more than the London markets can take off their hands.

"Moſt of the ſalmon taken before April, or to the ſetting in of the warm weather, is ſent freſh to London in baſkets; unleſs now and then the veſſel is diſappointed by contrary winds of ſailing immediately; in which caſe the fiſh is brought aſhore again to the coopers offices, and boiled, pickled, and kitted, and ſent to the London markets by the ſame ſhip, and freſh ſalmon put in the baſkets in lieu of the ſtale ones. At the beginning of the ſeaſon, when a ſhip is on the point of ſailing, a freſh clean ſalmon will ſell from a ſhilling to eighteen pence a pound; and moſt of the time that this part of the trade is carried on, the prices are from five to nine ſhillings per ſtone; the value riſing and falling according to the plenty of fiſh, or the proſpect of a fair or foul wind. Some fiſh are ſent in this manner to London the latter end of September, when the weather grows cool; but then the fiſh are full of large roes, grow very thin-bellied, and are not eſteemed either palatable or wholeſome.

"The ſeaſon for fiſhing in the Tweed begins November 30th, but the fiſhermen work very little till after Chriſtmas: it ends on Michaelmas-day; yet the corporation of Berwick (who are conſervators of the river) indulge the fiſhermen with a fortnight paſt that time, on account of the change of the ſtyle.

"There are on the river 41 conſiderable fiſheries, extending upwards, about 14 miles from the mouth, (the others above being of no great value), which are rented for near 5400 l. *per annum*: the expence attending the ſervants wages, nets, boats, &c. amount to 5000 l. more; which together makes up the ſum 10,400 l. Now, in conſequence, the produce muſt defray all, and no leſs than 20 times that ſum of fiſh will effect it; ſo that 208,000 ſalmon muſt be caught there one year with another.

"Scotland poſſeſſes great numbers of fine fiſheries on both ſides of that kingdom. The Scotch in early times had moſt ſevere laws againſt the killing of this fiſh; for the third offence was made capital, by a law of James IV. Before that, the offender had power to redeem his life. They were thought in the time of Henry VI. a preſent worthy of a crowned head: for in that reign the queen of Scotland ſent to the ducheſs of Clarence 10 caſks of ſalted ſalmon; which Henry directed to paſs duty-free. The ſalmon are cured in the ſame manner as at Berwick, and a great quantity is ſent to London in the ſpring; but after that time, the adventurers began to barrel and export them to foreign countries: but we believe that commerce is far leſs lucrative than it was in former times, partly owing to the great increaſe of the Newfoundland fiſhery, and partly to the general relaxation of the diſcipline of abſtinence in the Romiſh church.

"Ireland (particularly the north) abounds with this fiſh: the moſt conſiderable fiſhery is at Cranna, on the river Ban, about a mile and an half from Coleraine. When I made the tour of that hoſpitable kingdom in 1754, it was rented by a neighbouring gentleman for L. 620 a-year; who aſſured me, that the tenant, his predeceſſor, gave L. 1600 *per annum*, and was a much greater gainer by the bargain, for the reaſons before-mentioned, and on account of the number of poachers who deſtroy the fiſh in the fence-months. Fiſhery.

"The mouth of this river faces the north; and is finely ſituated to receive the fiſh that roam along the coaſt in ſearch of an inlet into ſome freſh water, as they do all along that end of the kingdom which oppoſes itſelf to the northern ocean. We have ſeen near Ballicaſtle, nets placed in the ſea at the foot of the promontories that jut into it, which the ſalmon ſtrike into as they are wandering cloſe to ſhore; and numbers are taken by that method.

"In the Ban they fiſh with nets 18 ſcore yards long, and are continually drawing night and day the whole ſeaſon, which we think laſts about four months, two ſets of 16 men each alternately relieving one another. The beſt drawing is when the tide is coming in: we were told, that at a ſingle draught there were once 840 fiſh taken.

"A few miles higher up the river is a wear, where a conſiderable number of fiſh that eſcape the nets are taken. We were lately informed, that, in the year 1760, about 320 tons were taken in the Crana fiſhery."

Curing Salmon. When the ſalmon are taken, they open them along the back, take out the guts and gills, and cut out the greateſt part of the bones, endeavouring to make the inſide as ſmooth as poſſible: they then ſalt the fiſh in large tubs for the purpoſe, where they lie a conſiderable time ſoaking in brine; and about October, they are packed cloſe up in barrels, and ſent to London, or exported up the Mediterranean. They have alſo in Scotland a great deal of ſalmon ſalted in the common way, which after ſoaking in brine a competent time, is well preſſed, and then dried in ſmoke: this is called *kipper*, and is chiefly made for home conſumption; and if properly cured and prepared, is reckoned very delicious.

Sturgeon † FISHERY. The greateſt ſturgeon-fiſhery is in the mouth of the Volga, on the Caſpian ſea; where the Muſcovites employ a great number of hands, and catch them in a kind of incloſure formed by huge ſtakes repreſenting the letter Z repeated ſeveral times. Theſe fiſheries are open on the ſide next the ſea, and cloſe on the other; by which means the fiſh aſcending in its ſeaſon up the river, is embarraſſed in theſe narrow angular retreats, and ſo is eaſily killed with a harping-iron. Sturgeons, when freſh, eat deliciouſly; and in order to make them keep, they are ſalted or pickled in large pieces, and put up in cags from 30 to 50 pounds. But the great object of this fiſhery is the roe, of which the Muſcovites are extremely fond, and of which is made the caveat, or kavia, ſo much eſteemed by the Italians. See CAVEAR. * See Acipenſer.

*Tunny-*FISHERY. The tunny (a ſpecies of SCOMBER, which ſee), was a fiſh well-known to the ancients, and made a great article of commerce: And there are ſtill very conſiderable tunny-fiſheries on the coaſts of Sicily, as well as ſeveral other parts of the Mediterranean.

The nets are ſpread over a large ſpace of ſea by means of cables faſtened to anchors, and are divided into ſeveral compartments. The entrance is always directed, according to the ſeaſon, towards that part of the ſea from which the fiſh are known to come. A man,

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Fiſhery. man placed upon the ſummit of a rock high above the water, gives the ſignal of the fiſh being arrived; for he can diſcern from that elevation what paſſes under the waters infinitely better than any perſon nearer the ſurface. As ſoon as notice is given that the ſhoal of fiſh has penetrated as far as the inner compartment, or the chamber of death, the paſſage is drawn cloſe, and the ſlaughter begins.

The undertakers of theſe fiſheries pay an acknowledgment to the king, or the lord upon whoſe land they fix the main ſtay or foot of the tonnara; they make the beſt bargain they can: and, till ſucceſs has crowned their endeavours, obtain this leave for a ſmall conſideration; but the rent is afterwards raiſed in proportion to their capture.

The tunny enters the Mediterranean about the vernal equinox, travelling in a triangular phalanx, ſo as to cut the waters with its point, and to preſent an extenſive baſe for the tides and currents to act againſt, and impel forwards. Theſe fiſh repair to the warm ſeas of Greece to ſpawn, ſteering their courſe thither along the European ſhores, but as they return, approach the African coaſt; the young fry is placed in the van of the ſquadron as they travel. They come back from the eaſt in May, and abound on the coaſt of Sicily and Calabria about that time. In autumn they ſteer northward, and frequent the neighbourhood of Amalfi and Naples; but during the whole ſeaſon ſtragglers are occaſionally caught.

When taken in May, the uſual time of their appearance in the Calabrian bays, they are full of ſpawn, and their fleſh is then eſteemed unwholeſome, apt to occaſion headachs and vapours; the milts and roes are particularly ſo at that ſeaſon. To prevent theſe bad effects, the natives fry them in oil, and afterwards ſalt them. The quantity of this fiſh conſumed annually in the two Sicilies almoſt exceeds the bounds of calculation. From the beginning of May to the end of October it is eaten freſh, and all the reſt of the year it is in uſe ſalted. The moſt delicate part is the muzzle. The belly ſalted was called *tarantallum*, and accounted a great delicacy by the Romans; its preſent name is *Surra*. The reſt of the body is cut into ſlices, and put into tubs.

Turbot-Fishery. Turbots grow to a large ſize, ſome of them weighing from 23 to 30 pounds. They are taken chiefly off the north coaſt of England, and others off the Dutch coaſt. The large turbot (as well as ſeveral other kinds of flat fiſh) are taken by the hook and line, for they lie in deep water; the method of taking them in weirs or ſtaked nets being very precarious. When the fiſhermen go out to fiſh, each perſon is provided with three lines, which are coiled on a flat oblong piece of wicker-work; the hooks being baited, and placed regularly in the centre of the coil. Each line is furniſhed with 14 ſcore of hooks, at the diſtance of ſix feet two inches from each other. The hooks are faſtened to the lines upon ſneads of twiſted horſe-hair 27 inches in length. When fiſhing, there are always three men in each coble, and conſequently nine of theſe lines are faſtened together, and uſed as one line, extending in length near three miles, and furniſhed with 2520 hooks. An anchor and a buoy are fixed at the firſt end of the line, and one more of each at the end of each man's lines; in all four anchors, which are common perforated ſtones, and four buoys made of leather or cork. The line is always laid acroſs the current. The tides of flood and ebb continue an equal time upon our coaſt, and, when undiſturbed by winds, run each way about ſix hours; they are ſo rapid that the fiſhermen can only ſhoot and haul their lines at the turn of tide, and therefore the lines always remain upon the ground about ſix hours; during which time the *myxine glutinoſa* of Linnæus will frequently penetrate the fiſh that are on the hooks, and entirely devour them, leaving only the ſkin and bones. The ſame rapidity of tides prevents their uſing hand-lines; and therefore two of the people commonly wrap themſelves in the ſail, and ſleep while the other keeps a ſtrict look-out, for fear of being run down by ſhips, and to obſerve the weather. For ſtorms often riſe ſo ſuddenly, that it is with extreme difficulty they can ſometimes eſcape to the ſhore, leaving their lines behind. Fiſhery.

Beſides the coble, the fiſhermen have alſo a five-men boat, which is 40 feet long and 15 broad, and 25 tons burden; it is ſo called, though navigated by ſix men and a boy, becauſe one of the men is commonly hired to cook, &c. and does not ſhare in the profits with the other five. This boat is decked at each end, but open in the middle, and has two large lug-ſails. All our able fiſhermen go in theſe boats to the herring-fiſhery at Yarmouth in the latter end of September, and return about the middle of November. The boats are then laid up till the beginning of Lent, at which time they go off in them to the edge of the Dogger, and other places, to fiſh for turbot, cod, ling, ſkates, &c. They always take two cobles on board; and when they come upon their ground, anchor the boat, throw out the cobles, and fiſh in the ſame manner as thoſe do who go from the ſhore in a coble; with this difference only, that here each man is provided with double the quantity of lines, and inſtead of waiting the return of the tide in the coble, return to their boat and bait their other lines; thus hawling one ſet and ſhooting another every turn of tide. They commonly run into harbour twice a week to deliver their fiſh.

The beſt bait is freſh herring cut in pieces of a proper ſize; the five-men boats are always furniſhed with nets for taking them. Next to herrings are the leſſer lampreys. The next baits in eſteem are ſmall haddocks cut in pieces, ſand-worms, and limpets, here called *ſlidders*; and when none of theſe can be had, they uſe bullock's liver. The hooks are two inches and a half long in the ſhank, and near an inch wide between the ſhank and the point. The line is made of ſmall cording, and is always tanned before it is uſed.

Turbots are extremely delicate in their choice of baits; for if a piece of herring or haddock has been 12 hours out of the ſea, and then uſed as bait, they will not touch it.

Whale-Fishery.* Whales are chiefly caught in the north ſeas: the largeſt ſort are found about Greenland or Spitzbergen. At the firſt diſcovery of this country, whales not being uſed to be diſturbed, frequently came into the very bays, and were accordingly killed almoſt cloſe to the ſhore; ſo that the blubber being cut off was immediately boiled into oil on the ſpot. The ſhips in thoſe times took in nothing but the pure oil and the whalebone, and all the buſineſs was executed in

* See *Balæna*.

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Fiſhery. in the country; by which means a ſhip could bring home the product of many more whales than ſhe can according to the preſent method of conducting this trade. The fiſhery alſo was then ſo plentiful, that they were obliged ſometimes to ſend other ſhips to fetch off the oil they had made, the quantity being more than the fiſhing ſhips could bring away. But time and change of circumſtances have ſhifted the ſituation of this trade. The ſhips coming in ſuch numbers from Holland, Denmark, Hamburgh, and other northern countries, all intruders upon the Engliſh, who were the firſt diſcoverers of Greenland, the whales were diſturbed, and gradually, as other fiſh often do, foreſaking the place, were not to be killed ſo near the ſhore as before; but are now found, and have been ſo ever ſince, in the openings and ſpace among the ice, where they have deep water, and where they go ſometimes a great many leagues from the ſhore.

The whale-fiſhery begins in May, and continues all June and July; but whether the ſhips have good or bad ſucceſs, they muſt come away, and get clear of the ice, by the end of Auguſt; ſo that in the month of September at fartheſt they may be expected home; but a ſhip that meets with a fortunate and early fiſhery in May may return in June or July.

The manner of taking whales at preſent is as follows.—Every ſhip is provided with ſix boats, to each of which belong ſix men for rowing the boat, and an harpooneer, whoſe buſineſs is to ſtrike the whale with his harpoon. Two of theſe boats are kept conſtantly on the watch at ſome diſtance from the ſhip, faſtened to pieces of ice, and are relieved by others every four hours. As ſoon as a whale is perceived, both the boats ſet out in purſuit of it, and if either of them can come up before the whale finally deſcends, which is known by his throwing up his tail, the harpooner diſcharges his harpoon at him. There is no difficulty in chooſing the place where the whale is to be ſtruck, as ſome have aſſerted; for theſe creatures only come up to the ſurface in order to ſpout up the water, or *blow*, as the fiſhermen term it, and therefore always keep the ſoft and vulnerable part of their bodies above water. A late improvement was made in the method of diſcharging the harpoon; namely, by ſhooting it out of a kind of ſwivel or muſquetoon: but it doth not appear, that ſince this improvement was made, the whale-fiſhing ſhips have had better ſucceſs than before. —As ſoon as the whale is ſtruck, the men ſet up one of their oars in the middle of the boat as a ſignal to thoſe in the ſhip. On perceiving this, the watchman alarms all the reſt with the cry of *fall! fall!* upon which all the other boats are immediately ſent out to the aſſiſtance of the firſt.

The whale finding himſelf wounded, runs off with prodigious violence. Sometimes he deſcends perpendicularly; at others goes off horizontally, at a ſmall depth below the ſurface. The rope which is faſtened to the harpoon is about 200 fathoms long, and properly coiled up, that it may freely be given out as there is a demand for it. At firſt, the velocity with which this line runs over the ſide of the boat is ſo great, that it is wetted to prevent its taking fire: but in a ſhort time the ſtrength of the whale begins to fail, and the fiſhermen, inſtead of letting out more rope, ſtrive as much as poſſible to pull back what is given out already, though they always find themſelves neceſſitated to yield at laſt to the efforts of the animal, to prevent his ſinking their boat. If he runs out the 200 fathoms of line contained in one boat, that belonging to another is immediately faſtened to the end of the firſt, and ſo on; and there have been inſtances, where all the rope belonging to the ſix boats has been neceſſary, though half that quantity is ſeldom required. The whale cannot ſtay long below water, but again comes up to blow; and being now much fatigued and wounded, ſtays longer above water than uſual. This gives another boat time to come up with him, and he is again ſtruck with an harpoon. He again deſcends, but with leſs force than before; and when he comes up again, is generally incapable of deſcending, but ſuffers himſelf to be wounded and killed with long lances which the men are provided with for the purpoſe. He is known to be near death when he ſpouts up the water deeply tinged with blood. Fiſhery.

The whale being dead, is laſhed along-ſide the ſhip. They then lay it on one ſide, and put two ropes, one at the head, and the other in the place of the tail, which, together with the fins, is ſtruck off as ſoon as he is taken, to keep theſe extremities above water. On the off-ſide of the whale are two boats, to receive the pieces of fat, utenſils, and men, that might otherwiſe fall into the water on that ſide. Theſe precautions being taken, three or four men with irons at their feet to prevent ſlipping, get on the whale, and begin to cut out pieces of about three feet thick and eight long, which are hauled up at the capſtane or windleſs. When the fat is all got off, they cut off the whiſkers of the upper jaw with an ax. Before they cut, they are all laſhed to keep them firm; which alſo facilitates the cutting, and prevents them from falling into the ſea: when on board, five or ſix of them are bundled together, and properly ſtowed; and after all is got off, the carcaſe is turned a-drift, and devoured by the bears, who are very fond of it. In proportion as the large pieces of fat are cut off, the reſt of the crew are employed in ſlicing them ſmaller, and picking out all the lean. When this is prepared, they ſtow it under the deck, where it lies till the fat of all the whales is on board; then cutting it ſtill ſmaller, they put it up in tubs in the hold, cramming them very full and cloſe. Nothing now remains but to ſail homewards, where the fat is to be boiled and melted down into train-oil.

It were in vain to ſpeak in this place of the advantages that may be derived to Great Britain from the whale-fiſhery. We ſhall only remark, that the legiſlature, juſtly conſidering that trade as of great national importance, beſtowed upon it at different periods very conſiderable encouragements. In particular, every Britiſh veſſel of 200 tons or upwards, bound to the Greenland ſeas on the whale-fiſhery, if found to be duly qualified according to the act, obtained a licence from the commiſſioners of the cuſtoms to proceed on ſuch voyage: and on the ſhip's return, the maſter and mate making oath that they proceeded on ſuch voyage and no other, and uſed all their endeavours to take whales, &c. and that all the

2 whale-

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Fishery || Fishing.

whale-fins, blubber, oil, &c. imported in their ship, were taken by their crew in those seas, there was allowed 40s. for every ton according to the admeasurement of the ship.

It was afterwards found, however, that so great a bounty was neither necessary to the success of the trade, nor expedient with regard to the public. In 1786, therefore, the acts conferring the said emoluments being upon the point of expiring, the subject was brought under the consideration of parliament; and it was proposed to continue the former measures, but with a reduction of the bounty from 40s. to 30s. In proposing this alteration, it was stated, "that the sums which this country had paid in bounties for the Greenland fishery amounted to L.1,265,461; that, in the last year, we had paid L.94,858; and that, from the consequent deduction of the price of the fish, the public at present paid 60 *per cent.* upon every cargo. In the Greenland fishery there were employed 6000 seamen, and these seamen cost government L.13, 10s. per man *per annum*, though we were never able to obtain more than 500 of that number to serve on board our ships of war. Besides, the vast encouragement given to the trade had occasioned such a glut in the market, that it was found necessary to export considerable quantities; and thus we paid a large share of the purchase-money for foreign nations, as well as for our own people, besides supplying them with the materials of several important manufactures." This proposition was opposed by several members, but was finally carried; and the propriety of the measure became very soon apparent. At that time (1786) the number of ships employed from England in the whale-fishery to Davis's Straits and the Greenland seas amounted to 139, besides 15 from Scotland. The proposed alteration took place the next year (1787); and notwithstanding the diminution of the bounty, the trade increased; the number of ships employed the same year from England amounting to 217, and the next year (1788) to 222.

FISHGARD, or FISGARD, a town of Pembrokeshire, situated on a steep cliff on the sea-shore, 254 miles from London, at the influx of the river Gwaine into the sea, which here forms a spacious bay. It is governed by a mayor, a bailiff, and other officers; and here vessels may lie safely in five or six fathoms water. The inhabitants have a good trade in herrings, and annually cure, between Fisgard and Newport, above 1000 barrels of them. The town sends one member to parliament.

FISHING, in general, the art of catching fish, whether by means of nets, of spears, or of the line and hook.

FISHING in the great, performed by the net, spear, or harpoon, for fish that go in shoals, has been explained in the preceding article. That performed by the rod, line, and hook, for solitary fish, is usually termed ANGLING: See that article; and for the particular manner of angling for the different kinds of fish, see their respective names, as DACE, ESL, PERCH, &c. The following were omitted in their order.

* See *Cyprinus*, 2.

1. The *Barbel* *, (so called on account of the bark or beard that is under his chops), though a coarse fish, gives considerable exercise to the angler's ingenuity. They swim together in great shoals, and are at their worst in April, at which time they spawn, but come soon in season: the places whither they chiefly resort, are such as are weedy and gravelly rising grounds, in which this fish is said to dig and root with his nose like a swine. In the summer he frequents the strongest, swiftest, currents of water; as deep bridges, wears, &c. and is apt to settle himself amongst the piles, hollow places, and mos, or weeds; and will remain there immoveable: but in the winter he retires into deep waters, and helps the female to make a hole in the sands to hide her spawn in, to hinder its being devoured by other fish. He is a very curious and cunning fish; for if his baits be not sweet, clean, well-scoured, and kept in sweet mos, he will not bite; but well-ordered and curiously kept, he will bite with great eagerness. The best bait for him is the spawn of a salmon, trout, or any other fish; and if you would have good sport with him, bait the places where you intend to fish with it a night or two before, or with large worms cut in pieces; and the earlier in the morning or the later in the evening that you fish, the better it will be. Your rod and line must be both strong and long, with a running plummet on the line; and let a little bit of lead be placed a foot or more above the hook, to keep the bullet from falling on it: so the worm will be at the bottom, where they always bite; and when the fish takes the bait, your plummet will lie and not choke him. By the bending of your rod you may know when he bites, as also with your hand you will feel him make a strong snatch; then strike, and you will rarely fail, if you play him well; but if you manage him not dexterously, he will break your line. The best time for fishing is about nine in the morning, and the most proper season is the latter end of May, June, July, and the beginning of August. *Sportsm. Dict.*

2. The *Bleak* †, is an eager fish, caught with all sorts of worms bred on trees or plants; as also with flies, paste, sheep's blood, &c. They may be angled for with half a score of hooks at once, if they can be all fastened on: he will also in the evening take a natural or artificial fly. If the day be warm and clear, there is no fly so good for him as the small fly at the top of the water, which he will take at any time of the day, especially in the evening: but if the day is cold and cloudy, gentles and caddis are the best; about two feet under water. No fish yields better sport to a young angler than the bleak. It is so eager, that it will leap out of the water for a bait. † See *Cyprinus*, 9.

There is another way of taking bleak, which is by whipping them in a boat, or on a bank-side in fresh water in a summer's evening, with a hazel top about five or six feet long and a line twice the length of the rod. But the best method is with a drabble, thus: Tie eight or ten small hooks across a line two inches above one another; the biggest hook the lowermost, (whereby you may sometimes take a better fish), and bait them with gentles, flies, or some small red worms, by which means you may take half a dozen or more at a time.

3. For the *Bream* †, observe the following directions, which will also be of use in carp-fishing.—Procure about a quart of large red worms; put them into fresh mos well washed and dried every three or four days, feeding them with fat mould and chopped fennel, and they will be thoroughly scoured in about three weeks. † See *Cyprinus*, 5.

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Fiſhing. Let your lines be ſilk and hair, but all ſilk is the beſt: let the floats be either ſwan-quills or gooſe-quills. Let your plumb be a piece of lead in the ſhape of a pear, with a ſmall ring at the little end of it: faſten the lead to the line, and the line-hook to the lead, about ten or twelve inches ſpace between lead and hook will be enough; and take care the lead be heavy enough to ſink the float. Having baited your hook well with a ſtrong worm, the worm will draw the hook up and down in the bottom, which will provoke the bream to bite the more eagerly. It will be beſt to fit up three or four rods and lines in this manner, and ſet them as will be directed, and this will afford you much the better ſport. Find the exact depth of the water if poſſible, that your float may ſwim on its ſurface directly over the lead; then provide the following ground bait: take about a peck of ſweet groſs-ground-malt; and having boiled it a very little, ſtrain it hard through a bag, and carry it to the water-ſide where you have ſounded; and in the place where you ſuppoſe the fiſh frequent, thwe throw in the malt by handfuls ſqueezed hard together, that the ſtream may not ſeparate it before it comes to the bottom; and be ſure to throw it in at leaſt a yard above the place where you intend the hook ſhall lie, otherwiſe the ſtream will carry it down too far. Do this about nine o'clock at night, keeping ſome of the malt in the bag; and go to the place about three the next morning; but approach very warily, leſt you ſhould be ſeen by the fiſh; for it is certain that they have their centinels watching on the top of the water, while the reſt are feeding below. Having baited your hook ſo that the worm may crawl to and fro, the better to allure the fiſh to bite, caſt it in at the place where you find the fiſh to ſtay moſt, which is generally in the broadeſt and deepeſt part of the river, and ſo that it may reſt about the midſt of your bait that is on the ground. Caſt in your ſecond line ſo that it may reſt a yard above that, and a third about a yard below it. Let your roads lie on the bank with ſome ſtones to keep them down at the great ends; and then withdraw yourſelf, yet not ſo far but that you can have your eye upon all the floats: and when you ſee one bitten and carried away, do not be too haſty to run in, but give time to the fiſh to tire himſelf, and then touch him gently. When you perceive the float ſink, creep to the water-ſide, and give it as much line as you can. If it is a bream or carp, they will run to the other ſide; which ſtrike gently, and hold your rod at a bent a little while; but do not pull, for then you will ſpoil all; but you muſt firſt tire them before they can be landed, for they are very ſhy. If there are any carps in the river, it is an even wager that you take one or more of them: but if there are any pike or perch, they will be ſure to viſit the ground-bait, though they will not touch it, being drawn thither by the great reſort of the ſmall fiſh; and until you remove them, it is in vain to think of taking the bream or carp. In this caſe, bait one of your hooks with a ſmall bleak, roach, or gudgeon, about two feet deep from your float, with a little red worm at the point of your hook; and if a pike be there, he will be ſure to ſnap at it. This ſport is good till nine o'clock in the morning; and, in a gloomy day, till night: but do not frequent the place too much, leſt the fiſh grow ſhy.

Sportſ. Dict.

4. The *carp* *. A perſon who angles for carp muſt arm himſelf with abundance of patience, becauſe of its extraordinary ſubtilty and policy: they always chooſe to lie in the deepeſt places, either of ponds or rivers, where there is but a ſmall running ſtream. Fiſh. * See Cyp. and Cyprinus.

Further, obſerve, that they will ſeldom bite in cold weather; and you cannot be too early or too late at the ſport in hot weather: and if he bite, you need not fear his hold; for he is one of thoſe leather-mouthed fiſh that have their teeth in their throat.

Neither muſt you forget, in angling for him, to have a ſtrong rod and line; and ſince he is ſo very wary, it will be proper to entice him, by baiting the ground with a coarſe paſte.

He ſeldom refuſes the red worm in March, the caddis in June, nor the graſhopper in June, April, and September.

This fiſh does not only delight in worms, but alſo in ſweet paſte; of which there is great variety; the beſt is made of honey and ſugar, and ought to be thrown into the water ſome hours before you begin to angle; neither will ſmall pellets thrown into the water two or three days before be worſe for this purpoſe, eſpecially if chickens guts, garbage, or blood mixed with bran and cow-dung, be alſo thrown in.

But more particularly, as to a paſte very proper for this uſe, you may make it in the manner following: Take a ſufficient quantity of flour, and mingle it with veal, cut ſmall, making it up with a compound of honey; then pound all together in a mortar till they are ſo tough as to hang upon the hook without waſhing off. In order to effect which the better, mingle whitiſh wool with it; and if you keep it all the year round, add ſome virgin wax and clarified honey.

Again, if you fiſh with gentles, anoint them with honey, and put them on your hook, with a deep ſcarlet dipped in the like, which is a good way to deceive the fiſh.

Honey and crumbs of wheat-bread, mixed together, make alſo a very good paſte.

In taking a carp either in pond or river, if the angler intends to add profit to his pleaſure, he muſt take a peck of ale-grains, and a good quantity of any blood to mix with the grains, baiting the ground with it where he intends to angle. This food will wonderfully attract the ſcale-fiſh, as carp, tench, roach, dace, and bream.

Let him angle in a morning, plumbing his ground, and angling for carp with a ſtrong line: the bait muſt be either paſte or a knotted red worm; and by this means he will have ſport enough.

Deſcription of proper Baits for the ſeveral ſorts of FISH *referred to in the annexed Table.*

Flies.] 1. Stone-fly, found under hollow ſtones at the ſide of rivers, is of a brown colour, with yellow ſtreaks on the back and belly, has large wings, and is in ſeaſon from April to July. 2 Green drake, found among ſtones by river-ſides, has a yellow body ribbed with green, is long and ſlender, with wings like a butterfly, his tail turns on his back, and from May to Midſummer is very good. 3. Oak-fly, found in the body of an old oak or aſh, with its head downwards, is of a brown colour, and excellent from May to September. 4. Palmer-fly or worm, found on leaves of plants, is commonly called a *caterpillar*, and when it comes to

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Fishing. a fly is excellent for trout. 5. Ant-fly, found in ant-hills from June to September. 6. The May-fly is to be found playing at the river-side, especially against rain. 7. The black-fly is to be found upon every hawthorn after the buds are come off.

Pastes.] 1. Take the blood of sheeps hearts, and mix it with honey and flour worked to a proper consistence. 2. Take old cheese grated, a little butter sufficient to work it, and colour it with saffron: in winter use rusty bacon instead of butter. 3. Crumbs of bread chewed or worked with honey or sugar, moistened with gum-ivy water. 4. Bread chewed, and worked in the hand till stiff.

Worms.] 1. The earth-bob, found in sandy ground after ploughing, it is white, with a red head, and bigger than a gentle: another is found in heathy ground, with a blue head. Keep them in an earthen vessel well covered, and a sufficient quantity of the mould they harbour in. They are excellent from April to November. 2. Gentles, to be had from putrid flesh: let them lie in wheat-bran a few days before used. 3. Flag-worms, found in the roots of flags; they are of a pale yellow colour, are longer and thinner than a gentle, and must be scowred like them. 4. Cow-turd-bob, or clap-bait, found under a cow-turd from May to Michaelmas; it is like a gentle, but larger. Keep it in its native earth like the earth-bob. 5. Cadis worm, or cod-bait, found under loose stones in shallow rivers; they are yellow, bigger than a gentle, with a black or blue head, and are in season from April to July. Keep them in flannel bags. 6. Lob-worm, found in gardens; it is very large, and has a red head, a streak down the back, and a flat broad tail. 7. Marsh-worms, found in marshy ground: keep them in moss ten days before you use them: their colour is a bluish red, and are a good bait from March to Michaelmas. 8. Brandling red-worms, or blood-worms found in rotten dunghills and tanners bark; they are small red-worms, very good for all small fish, have sometimes a yellow tail, and are called *tag-tail.*

Fish and Insects.] 1. Minnow. 2. Gudgeon. 3. Roach. 4. Dace. 5. Smelt. 6. Yellow frog. 7. Snail slit. 8. Grashopper.

Fishing-Fly, a bait used in angling for divers kinds of fish. See Fishing.

The fly is either *natural* or *artificial*:

I. *Natural* flies are innumerable. The more usual for this purpose are mentioned in the preceding page.

There are two ways to fish with natural flies: either on the surface of the water or a little underneath it.

In angling for chevin, roach, or dace, move not your natural fly swiftly, when you see the fish make at it; but rather let it glide freely towards him with the stream: but if it be in a still and slow water, draw the fly slowly sidewise by him, which will make him eagerly pursue.

II. The *artificial* fly is seldom used but in blustering weather, when the waters are so troubled by the winds, that the natural fly cannot be seen, nor rest upon them. Of this artificial fly there are reckoned no less than 12 sorts, of which the following are the principal.

1. For March, the dun-fly; made of dun-wool, and the feathers of the partridge's wing; or the body made of black wool, and the feathers of a black drake. 2. For April, the stone-fly; the body made of black wool, dyed yellow under the wings and tail. 3. For the beginning of May, the ruddy fly; made of red wool, and bound about with black silk, with the feathers of a black capon hanging dangling on his sides next his tail. 4. For June, the greenish fly; the body made of black wool, with a yellow list on either side, the wings taken off the wings of a buzzard, bound with black broken hemp. 5. The moorish fly, the body made of duskish wool, and the wings of the blackish mail of a drake. 6. The tawny fly, good till the middle of June; the body made of tawny wool, the wings made contrary one against the other, of the whitish mail of a white drake. 7. For July, the wasp-fly; the body made of black wool, cast about with yellow silk, and the wings of drakes feathers. 8. The steel-fly, good in the middle of July; the body made with greenish wool, cast about with the feathers of a peacock's tail, and the wings made of those of the buzzard. 9. For August, the drake-fly; the body made with black wool cast about with black silk; his wings of the mail of a black drake, with a black head.

The best rules for artificial fly-fishing are,

1. To fish in a river somewhat disturbed with rain: or in a cloudy day, when the waters are moved by a gentle breeze: the south wind is best; and if the wind blow high, yet not so but that you may conveniently guard your tackle, the fish will rise in plain deeps; but if the wind be small, the best angling is in swift streams. 2. Keep as far from the water-side as may be; fish down the stream with the sun at your back, and touch not the water with your line. 3. Ever angle in clear rivers, with a small fly and slender wings; but in muddy places, use a larger. 4. When, after rain, the water becomes browniſh, use an orange fly; in a clear day, a light-coloured fly; a dark fly for dark waters, &c. 5. Let the line be twice as long as the rod, unless the river be encumbered with wood. 6. For every sort of fly, have several of the same, differing in colour, to suit with the different complexions of several waters and weathers. 7. Have a nimble eye, and active hand, to strike presently with the rising of the fish; or else he will be apt to spue out the hook. 8. Let the fly fall first into the water, and not the line, which will scare the fish. 9. In slow rivers, or still places, cast the fly across the river, and let it sink a little in the water, and draw it gently back with the current.

Salmon-flies should be made with their wings standing one behind the other, whether two or four. This fish delights in the gaudiest colours that can be; chiefly in the wings, which must be long, as well as the tail.

Fishing by means of birds, a method peculiar to the Chinese, who train certain birds for the purpose in the same manner as falcons are taught to pursue game. See Cyprinus; and China, n° 121.

Fishing-Floats, are little appendages to the line, serving to keep the hook and bait suspended at the proper depth, to discover when the fish has hold of them, &c. Of these there are divers kinds; some made.

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Fishing.

An Epitome of the whole art of FISHING, wherein is ſhown (at one view), the harbours, ſeaſons, and depths, for catching all ſorts of fiſh uſually angled for; alſo the various baits for each, ſo digeſted as to contain the eſſence of all the treatiſes ever written on the ſubject, exempt from the ſuperfluities, which tend more to perplex than inſtruct.

Names.	Where found.	Season.	Time to ang.	Depth from ground.	Proper Baits.				
					Flies. N°	Paſtes. N°	Worms. N°	Fiſh and Inſects. N° 8.
Bream	rough ſtr. river or mid. pond	April to Mich.	Sun-riſe to 9	touch ground	——	1 3	1 to 7	
Barbel	gravel-banks in currents under bridges	April to Aug.	3 to Sun-ſet very early or late	ditto	——	2	2 6 7	——
Bleak	ſandy bottom, deep rivers, ſhips ſterns	May to Oct.	all day	6 inches from bottom	1 2	2	2 3 8	——
Carp	ſtill deep mud-bottom, pond or river	May to Aug.	Sun-riſe to 9	3 inches from bottom	——	1 3 4	1 2 3 4 7	——
Chub or Chevin	ditto	May to Dec.	3 to Sun-ſet ditto	hot weather, mid-water ditto	1 to 5	2	1 2 4 5	7 8
Dace	ſandy bottom, deep rivers, ſhips ſterns	May to Oct.	all day	6 to 12 inches from bottom	ditto	3 4	1 to 5 & 8	——
Gudgeon	gravel ſhoals	May to Oct.	ditto	near or on ground	——	ditto	2 8	——
Pike	near clay-banks	All the year.	ditto	mid-water	wh. ſtro. and ſnap	line float hook fixt	on ſhore	1 2 3 4 5 6 7
Pearch	river in ſtream; gravel or weedy pond deepeſt part; bottom	May to Aug.	S. riſe to 10 2 to Sun-ſet	ditto	2	1	3 5 7 8	1 6
Pope	deep holes in rivers	Aug. to May.	mid-day all day	6 inches from bottom ditto	5	——	all	——
Roach	ſandy bottom, deep rivers, ſhips ſterns	May to Oct.	ditto	6 to 12 inches	1 2 4 5	3 4	ditto	8
Salmon	deep rivers	Mar. to Sept.	8 to 9, 3 to 6	mid-way to the bottom	all large	——	1 5 6 7	1
Smelts	ſhips ſterns and docks	Apr. to Oct.	all day	mid-way to the bottom variable	all ſmall	——	1 2 5	bits of ſmelts
Trout	purling ſtream and eddies of ſtony bottom river	Mar. to Mich.	ditto	cold weather, 6 inches to 9 hot weather, top to mid-wat.	1 to 5	——	1 2 5 to 8	1 8
Tench	mud-bottom river or pond	All the year.	Sun-riſe to 9 3 to Sun-ſet	cold wea. 3 inch. from bot. hot weather mid-water	——	1 3 4	1 3 4 to 7	——
Umber or Grayling	clay bottom, ſwift ſtream	All the year.	all day	cold weather, 6 to 9 inches hot weather, top to mid-wat.	1 to 5	——	all	1 8

Sportſ. Dict.

made of Muſcovy-duck quills, which are the beſt for ſlow waters; but for ſtrong ſtreams, ſound cork, without flaws or holes, bored through with an hot iron, into which is put a quill of a fit proportion, is preferable: pare the cork to a pyramidal form, and make it ſmooth

FISHING-Hook, a ſmall inſtrument made of ſteel-wire, of a proper form to catch and retain fiſh.

The fiſhing hook, in general, ought to be long in the ſhank, ſomewhat thick in the circumference, the point even and ſtraight; let the bending be in the ſhank.

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Fishing, Fissures.

For setting the hook on, use strong, but small silk, laying the hair on the inside of your hook; for if it be on the outside, the silk will fret and cut it asunder.

There are several sizes of these fishing-hooks, some big, some little: and of these, some have peculiar names; as, 1. Single hooks. 2. Double hooks; which have two bendings, one contrary to the other. 3. Snappers, or gorgers, which are the hooks to whip the artificial fly upon, or bait with the natural fly. 4. Springers, or spring hooks; a kind of double hooks, with a spring, which flies open upon being struck into any fish, and so keep its mouth open.

Fishing-Line, is either made of hair twisted; or silk; or the Indian grass. The best colours are the sorrel, white, and grey; the two last for clear waters, the first for muddy ones. Nor is the pale watery green despisable; this colour is given artificially, by steeping the hair in a liquor made of alum, soot, and the juice of walnut-leaves, boiled together.

Fishing-Rod, a long slender rod or wand, to which the line is fastened, for angling.—Of these there are several sorts; as, 1. A troller, or trolling-rod, which has a ring at the end of the rod, for the line to go through when it runs off a reel. 2. A whipper, or whipping-rod; a top-rod, that is weak in the middle, and top heavy, but all slender and fine. 3. A dropper; which is a strong rod and very light. 4. A snapper, or snap-rod; which is a strong pole, peculiarly used for the pike. 5. A bottom-rod; being the same as the dropper, but somewhat more pliable. 6. A sniggling or procking stick; a forked stick, having a short strong line, with a needle, baited with a lobe worm: this is only for eels in their holes.

Fishing-Frog, or *Angler*. See Lophius.

Right of Fishing, and property of fish. It has been held, that where the lord of the manor hath the soil on both sides of the river, it is a good evidence that he hath a right of fishing; and it puts the proof upon him who claims *liberam piscariam*: but where a river ebbs and flows, and is an arm of the sea, there it is common to all, and he who claims a privilege to himself must prove it; for if the trespass is brought for fishing there, the defendant may justify, that the place where is *brachium maris, in quo unusquisque subditus domini regis habet et habere debet liberam piscariam*. In the Severn the soil belongs to the owners of the land on each side; and the soil of the river Thames is in the king, but the fishing is common to all. He who is owner of the soil of a private river, hath *separalis piscaria*; and he that hath *libera piscaria*, hath a property in the fish, and may bring a possessory action for them; but *communis piscaria* is like the case of all other commons. One that has a close pond in which there are fish, may call them *pisces suos*, in an indictment, &c. but he cannot call them *bona & catalla*, if they be not in trunks. There needs no privilege to make a fish-pond, as there doth in the case of a warren. See Franchise.

Jacob's Law Dict.

FISSURES, in the history of the earth, certain interruptions, that in an horizontal or parallel manner divide the several strata of which the body of our terrestrial globe is composed.

Fissure of the Bones, in surgery, is when they are divided either transversely or longitudinally, not quite through, but cracked after the manner of glass, by any external force. See Surgery.

FISTULA, in the ancient music, an instrument of the wind-kind, resembling our flute or flageolet.

Fistula Fitzherbert.

The principal wind-instruments of the ancients, were the tibia and the fistula. But how they were constituted, wherein they differed, or how they were played upon, does not appear. All we know is, that the fistula was at first made of reeds, and afterwards of other matters. Some had holes, some none; some again were single pipes; others a combination of several; witness the syringa of Pan.

Fistula, in surgery, a deep, narrow, and callous ulcer, generally arising from abscesses.

It differs from a *sinus*, in its being callous, the latter not. See Surgery.

Fistula, in farriery. See Farriery, Sect. xxxii.

FISTULARIA or Tobacco-pipe Fish; a genus of fishes, belonging to the order of abdominales. Of this genus Linnæus reckons two species; but we have a description only of one, viz. the tabacaria. It is described by Mr Catesby, from the only one he ever saw. It was almost a foot in length; the fore-part from the nose to half-way the body of nearly equal bigness; from whence it grew tapering to the tail, which was forked, and from which grew a slender taper whip, four inches long, of the consistence of whalebone; the mouth narrow, from which to the eyes was almost three inches. The whole fish was of a brown colour. They are sometimes taken on the coasts of Jamaica.

Plate CCVI.

FIT. See Paroxysm.

Dr Cheyne is of opinion that fits of all kinds, whether epileptic, hysteric, or apoplectic, may be cured solely by a milk-diet, of about two quarts of cows milk a-day, without any other medicine.

FITCHES, in husbandry, a sort of pulse, more generally known by the name of *chick-pea*. See Cicer.

Fitches are cultivated either for feeding cattle, or improving the land. They make a wholesome and nourishing food, whether given in the straw or threshed out. When sown only to improve the soil, they are ploughed in just as they begin to blossom, by which means a tough stiff clay-soil is much enriched.

FITCHET, a name used in some places for the weasel, called also the *foumart*. See Mustela.

FITCHY, in heraldry, (from the French *fiché*, i. e. *fixed*); a term applied to a cross when the lower branch ends in a sharp point: and the reason of it Mackenzie supposes to be, that the primitive Christians were wont to carry crosses with them wherever they went; and when they stopped on their journey at any place, they fixed those portable crosses in the ground for devotion's sake.

FITZ, makes part of the surname of some of the natural sons of the kings of England, as *Fitz-roy*; which is purely French, and signifies the "king's son."

FITZHERBERT (Sir Anthony), a very learned lawyer in the reign of king Henry VIII. was descended from an ancient family, and born at Norbury in Derbyshire. He was made one of the judges of the court of common-pleas in 1523; and distinguished himself by many valuable works, as well as by such an honourable discharge of the duties of his office, as made him esteemed an oracle of the law. His writings are, *The Grand Abridgment; The Office and Authority of Justices of Peace; the Office of Sheriffs, Bailiffs of Liberties, Escheators, Constables, Coroners*, &c.; *Of the Diversity of Courts;*

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Fitz-Stephen || Fixed Air.

Courts; *The New Natura Brevium*; *Of the Surveying of Lands*; and *The Book of Husbandry*. He died in 1538.

FITZ-STEPHEN (William), a learned monk of Canterbury, of Norman extraction, but born of respectable parents in the city of London. He lived in the 12th century; and being attached to the service of archbishop Becket, was present at the time of his murder. In the year 1174, he wrote in Latin, *The Life of St Thomas, archbishop and martyr*; in which, as Becket was a native of the metropolis, he introduces a description of the city of London, with a miscellaneous detail of the manners and usages of the citizens: this is deservedly considered as a great curiosity, being the earliest professed account of London extant. Fitz-Stephen died in 1191.

FIVES, or VIVES. See FARRIERY, Sect. xiv. 2.

FIXATION, in chemistry, the rendering any volatile substance fixed, so as not to fly off upon being exposed to a great heat: hence,

FIXED BODIES, are those which bear a considerable degree of heat without evaporating, or losing any of their weight. Among the most fixed bodies are diamonds, gold, &c. See DIAMOND, GOLD, &c.

FIXED, or *Fixable Air*, an invisible and permanently elastic fluid, superior in gravity to the common atmospheric air and most other aerial fluids, exceedingly destructive to animal life; produced in great quantities, naturally from combustible bodies, and artificially by many chemical processes. From its apparently acid properties it has obtained the name of *aerial acid*, *cretaceous acid*, and *carbonic acid*; from its noxious qualities, it has been called *mephitic air*, or *mephitic gas*; and, from the circumstance of being produced in vast quantities during the combustion of charcoal, it first obtained from Van Helmont the name of *gas sylvestre*. The term *fixed air* has been given from its property of readily losing its elasticity, and fixing itself in many bodies, particularly those of the calcareous kind; and though some objected to the propriety of the term, the fluid in question is so well known by the name of fixed air, that we choose still to retain it.

The nature and properties of fixed air are explained under the article AEROLOGY. It is there considered as an acid, and the reasons for supposing it to be composed of phlogiston and dephlogisticated air are set forth. In a paper of the Manchester Transactions by Mr Delaval on the permanent colours of opaque bodies, he considers the nature of fixed air, and gives an account somewhat different. He denies its acid property, which has been generally looked upon as so well ascertained. "The change of colour produced in vegetable juices by the electric spark (says he), is adduced as a proof of the acidity of fixed air; but it has been already shown, that this does not arise from acid, but phlogistic matter *. The acid quality of fixed air is also generally inferred from its power of dissolving iron. But phlogiston is also a solvent of iron. Thus a considerable portion of that metal is always dissolved and held in solution by the phlogisticated alkaline lixivium, which consists of inflammable matter calcined with fixed alkali. M. Margraaf has shown, that several other metals are soluble in this lixivium. Hence it is evident, that the solubility of iron does not prove the acidity of the solvent, but may arise from the phlogiston contained in it.

Mr Delaval's theory of fixed air.

* See *Chromatics*, p° 31.

Fixed Air.

"Fixed air is also supposed to be an acid, by diminishing the causticity and promoting the crystallization of fixed alkalies: but this hypothesis does not agree with the effects which are produced by the combination of acids with alkalies. By these combinations neutral salts are produced; but alkalies do not become neutral by combination with fixed air, being only changed by such an union from caustic and deliquescent to mild and crystallizable alkalies: whence it is evident, that the alteration in them produced by fixed air is not to be attributed to the introduction of an acid.

"We must therefore (continues our author) turn our eyes to the consideration of some other principle by which these effects may be produced; and this prinple appears to be phlogiston. The phlogisticated alkaline lixivium is perfectly mild when saturated; and by a slight evaporation is reduced to a concrete crystalline mass, which does not deliquesce or imbibe the least moisture from the air, and no longer retains any alkaline character or property. M. Beaumé, by an elegant and ingenious experiment, has proved the presence of phlogiston in mild alkalies; and has shown, that their power of crystallizing depends upon their union with that principle. He heated in a silver vessel a lixivium of mild alkali, which imparted to the silver a covering or coating of inflammable matter, by which its surface was tarnished and became black. The lixivium was several times poured out of the silver vessel; and after the surface of the metal had been freed from the tarnish, the lixivium was replaced in it, and again heated, by which the tarnish was renewed. This was repeated till the lixivium no longer communicated any stain to the silver. The causticity of the lixivium increased in proportion as it imparted its phlogiston to the silver; and at the end of the process the alkali became perfectly caustic and incapable of crystallizing.

"Those instances, and many others which might be adduced, seem to prove that the change which fixed air produces in caustic alkalies is not effected by acid but phlogistic matter. It is certain, that the matter communicated to lime by fixed air is the very same which it imparts to alkalies: for it may be transferred, unchanged, from one of these substances to another; and when united to either of them, still retains the same qualities. Therefore, if phlogiston renders alkalies mild, and effects their crystallization, the same principle also precipitates lime, and in like manner restores it to its state of mild calcareous earth.

"The experiments and observations on which Dr Black has established his comprehensive and consistent theory, clearly prove, that lime is precipitated from lime-water by fixed air; but his views were not extended to an investigation of the particular matter or quality whereby fixed air operates that effect.

"Lime, which has been precipitated from lime-water, and restored to the state of a mild calcareous earth, is again soluble by the addition of a larger proportion of fixed air; which has been considered as an additional proof of the acidity of the latter. It has also been considered as an extraordinary circumstance, that two such opposite effects should be produced by the same substance.

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Fixed Air. The ſimplicity obſerved by nature in her operations, however, will not allow us to ſuppoſe that fixed air is poſſeſſed of two different or oppoſite qualities, by one of which it precipitates, and by the other it diſſolves. The precipitation of lime from lime-water, and its reſolution, are effected by an equable uniform action, exerciſed by one and the ſame principle, which is a conſtituent and eſſential part of fixed air. Such a precipitation and reſolution are not extraordinary or complex phenomena, as has been thought, but are analogous to the ordinary and conſtant effects which ariſe from chemical affinities. This may be exemplified by any compound which aſſumes a concrete and ſolid conſiſtence by its union with a given quantity of fluid, and which by the addition of a larger quantity of the ſame fluid is reduced to a liquid ſtate. Thus, when a due proportion of water is added to iron and vitriolic acid, a mutual attraction takes place between theſe three ingredients, by means of which they are united; and, by their combination, a concrete vitriol or metallic ſalt is formed. But if a greater quantity of water be added to this concrete ſalt, as the mutual attraction after this addition ſubſiſts equably between the vitriolic ſalt and the whole maſs of water, the acid and ferruginous particles are more minutely divided, and diffuſed uniformly throughout every part of the water. Thus the ſolid concrete ſalt is reſolved, and a vitriolic liquor is formed, in which the water predominates.

"Lime ſtrongly attracts and unites with inflammable ſubſtances, as ſulphur, camphor, and reſins. Fixed air has a ſtill greater affinity with it; becauſe, in all the more groſs ſubſtances, the phlogiſton is allayed with ſalt, earth, and other matters: but in fixed air it exiſts in a purer, and conſequently a more active ſtate.

"As alkalies are rendered mild or cauſtic by the preſence or abſence of the inflammable principle, it can hardly be doubted that the difference between mild and calcareous earth and quicklime is alſo occaſioned by a communication or deprivation of the ſame principle.

"The origin of fixed air ſeems to prove its phlogiſtic nature; for all bodies which yield it, yield alſo inflammable matter, but many of them do not yield any acid. Calcareous ſpar, magneſia, and alkaline ſalts, ſend forth fixed air; and all theſe ſubſtances, by the loſs of it, are deprived of their inflammable contents. Diamonds, expoſed to the focus of a burning glaſs under a receiver, impart to the air contained in it a power of precipitating lime from lime-water when it is agitated with it: But it does not appear that any acid can be derived from theſe bodies.

"Some of the properties of fixed air are conſiſtent with either the character of an acid or phlogiſton. Such are, its power of altering the colour of vegetable juices; its affinity to alkalies, and ready union with lime; its power of diſſolving iron, which is inſtanced in all acids, and likewiſe in the phlogiſticated alkaline lixivium. The antiſeptic quality prevails equally in acids and in inflammable ſpirits. Acids are diſengaged from ſubſtances which are decompoſed by ſtronger acids; phlogiſton is likewiſe expelled from bodies which diſſolved in acids.

"The qualities of acid and phlogiſton agree in theſe and ſeveral other inſtances; but fixed air is endowed with properties which are peculiar to phlogiſton: ſuch Fixed Air. as its power of effecting the cryſtallization of alkalies without changing them to neutral ſalts; its tendency to eſcape from water; and its affinity with the air, by means of which a conſiderable quantity of fixed air is united with and diffuſed throughout every part of the atmoſphere.

"Water, as well as phlogiſton, is a conſtituent part of all ſubſtances which yield fixed air. Both theſe principles have a ſtrong affinity to air. This appears from the union which air forms with the inflammable principle when it is diſengaged from bodies by combuſtion, fermentation, putrefaction, or any other mode of decompoſition; and from the mutual attraction of water and air, which is manifeſted by evaporation, and by the conſtant preſence of aqueous particles in the atmoſphere.

"The laws of chemical analyſis will hardly permit us to doubt that the air which is obtained from mild alkalies, calcareous earth, and various other ſubſtances, receives from them, when they are decompoſed, the ſame contents which were united in them as conſtituent parts while they were in their entire ſtate; and their analyſis invariably ſhows, that air, water, and phlogiſton, enter their compoſition.

"Hence it ſeems to follow, that fixed air conſiſts of theſe three ingredients, either united in bodies, and diſcharged from them already combined, or that it is formed in the atmoſphere by the concurrence and union of theſe principles: and the phenomena both of fixed and phlogiſticated air may be ſolved by the action and properties of theſe ingredients.

"The weight of fixed air indicates that it contains a conſiderable portion of aqueous matter; and it is by means of this conſtituent principle that it is miſcible with water, in like manner as ardent ſpirits are, notwithſtanding their inflammable nature.

"Phlogiſtic matters are miſcible with water only in proportion as they contain a quantity of the aqueous principle in their compoſition. When the relative proportion of this conſtituent principle is leſs than that of the phlogiſton combined with ſuch matters, they are either immiſcible with water, or miſcible only in part. Thus, ſpirit of wine unites with water in all proportions. Ether, which is ſpirit of wine deprived of part of its water by means of the vitriolic acid, is not miſcible with water in all proportions; but ten parts of water are requiſite to the abſorption of one part of ether. Oil, which has ſtill leſs water in its compoſition, does not in any degree mix with water. Reſinous ſubſtances do not combine with water, becauſe their aqueous part is not in ſufficient quantity to ſerve as a medium for the union of their phlogiſton. In gums the relative proportion of phlogiſton is much leſs than in reſins, and that of the water is much greater; and, by the intervention of their aqueous part, gums are readily miſcible with water. Reſins, when united with a due proportion of gum, are by its mediation alſo rendered ſoluble in water. But if a leſs proportion of the gum be joined with the reſin, only a part of the compound reſulting from this union is diſpoſed to mix with water, and a reſiduum is left which is incapable of being diſſolved in any aqueous liquor.

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Fixed Air.

" Fixed air ſeems to reſemble thoſe matters which do not poſſeſs a ſufficient quantity of aqueous matter to render them totally ſoluble in water; for after a given portion of fixed air has been imbibed by water, a reſiduum remains which is incapable of being abſorbed by it, and is called *phlogiſticated air*. This air may be formed from fixed air, not only by the ſubtraction of water, but by the addition of the inflammable principle; as when phlogiſton is communicated to fixed air by electric ſparks, or the vapours diſengaged from a mixture of ſulphur and iron-filings.

" The origin of phlogiſticated air, ſhows that its difference from fixed air conſiſts chiefly in the deficiency of water. Hence, as metals contain no water, the phlogiſton which ariſes from them during calcination produces no fixed but phlogiſticated air. But vitriols, and all other ſaline matters, containing water as a conſtituent part, yield fixed air. Calces of metals alſo, which have received aqueous matter in the proceſs of their calcination, as white-lead and other calces, which have abſorbed water, together with the air, from the atmoſphere, yield alſo fixed air. The fermentation and putrefaction of animal and vegetable ſubſtances is effected by means of their moiſture, and therefore fixed air is produced in theſe proceſſes. It is more effectually produced by reſpiration than by many other phlogiſtic proceſſes, in conſequence of the copious ſupply of the aqueous, as well as the phlogiſtic principle, which the air receives from the lungs.

" Fixed air may be formed from vegetable acids; but when it is thus conſtituted, it does not differ from that which is produced from alkalies, magneſia, and other ſubſtances which yield no acid. It is therefore evident, that in each of theſe inſtances it is formed by the combination of ſome principles which are common to all thoſe ſubſtances. Theſe principles are water and phlogiſton. In vegetable acids, the phlogiſton combined with the water is equal in quantity to that which conſtitutes the inflammable part of ſpirit of wine; for radical or concentrated vinegar is totally inflammable. The acid ſtate of vegetable matters is not eſſential to them, nor is it requiſite to the production of fixed air from them; for fixed air is producible from recent plants. Hence it appears, that in their acid, as well as in their recent, vinous, or putrefactive ſtate, they yield fixed air by means of their aqueous and phlogiſtic principles.

" All fixed air, from whatever ſubject it may be procured, or to whatever bodies it is transferred, conſiſts conſtantly and invariably of the ſame materials, combined in the ſame proportions; otherwiſe it could not reſtore lime, cauſtic alkalies, &c. to their original mild ſtate; becauſe theſe ſubſtances cannot be recompoſed but by the ſame proportion of their conſtituent principles which they contained before their decompoſition. Thus, lime cannot be reſtored to the ſtate of mild calcareous earth by water or by pure dephlogiſticated air, becauſe each of theſe principles conſiſts only of one of the three ingredients which are requiſite for that purpoſe. Nor can the recompoſition of calcareous earth be effected by phlogiſticated air, becauſe it contains an exceſs of phlogiſton and a defect of water. Compounds formed of ſuch ingredients as do not contain a requiſite quantity of the principles neceſſary to conſtitute fixed air, may acquire a due proportion of them by an addition of the ingredients in which they are deficient. Pure dephlogiſticated air is reduced to fixed air by the communication of aqueous and phlogiſtic vapours diſengaged from bodies by various proceſſes: theſe principles have a great affinity to air, and readily combine with it. Phlogiſticated air, when agitated with water, receives into its compoſition a quantity of aqueous particles ſufficient to conſtitute it fixed air; and by that means it becomes capable of precipitating lime from lime-water. If the analyſis and recompoſition of calcareous earth be ever ſo often repeated, its analyſis will always yield, and its recompoſition will always require, the ſame relative quantities of air, water, and phlogiſton. Fixed air therefore ſeems to conſiſt of theſe three principles invariably and conſtantly combined in the ſame proportions. It has been frequently conſidered as a mere compound of air and phlogiſton; but ſuch a compound ſeems to approach nearer in its nature to phlogiſticated air, as it is deficient in one of the principles which is eſſential to fixed air."

Fixed Air.

On this account of fixed air it may be obſerved, that notwithſtanding all our author's arguments, there is no poſitive proof adduced againſt the acidity of fixed air. It is not certainly known whether mere phlogiſton will perfectly neutralize alkalies. The colouring matter of Pruſſian blue indeed will certainly do ſo: but this is not pure phlogiſton, but a compound of different ſubſtances; and beſides, the alkalies neutralized by it differ very conſiderably from thoſe rendered neutral by fixed air. Before we can attribute the effects of fixed air to mere phlogiſton, therefore, it would be neceſſary to form out of a cauſtic alkali, by means of pure phlogiſton, a ſalt exactly reſembling mild alkali produced by the union of the ſame cauſtic ſalt with fixed air; ſo that it ſhall not only have the ſame taſte and other external properties, but likewiſe emit fixed air upon the addition of a mineral acid. But by no experiment have we yet been able to effect this. It is abſolutely neceſſary that the inviſible and unknown ſubſtance called by Lavoiſier the *oxygenous principle*, by others the *baſis of dephlogiſticated* or *vital air*, ſhould be united to the inflammable matter, in order to the formation of the fixed air: and as this baſis is likewiſe found to be neceſſary to the formation of every acid, or at leaſt to thoſe of the mineral kind, we have equal reaſon to call fixed air an acid while it diſplays the properties of one.

Obſervations on the theory.

That water is an eſſential ingredient in the compoſition of fixed air as well as all other kinds of aerial vapours, is not to be doubted; but we are by no means certain whether the difference between fixed and phlogiſticated air conſiſts in the want of water in the latter. The ſpecific gravity here cannot be any rule for us to judge of the matter: for inflammable air, the lighteſt of all the kinds hitherto known, cannot be produced without a certain proportion of water; and by ſome proceſſes fixed air may be converted into inflammable as well as phlogiſticated air.

The noxious properties of fixed air are well known, and are too often fatally experienced by the miners, who have given it the appellation of the *choke-damp*. In the Manchester Tranſactions, however, we have an account

Account of the effects of this air on a perſon accidentally expoſed to it.

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Fixed Air.

account of one who continued ſeven days below ground, not only expoſed to the effects of this gas, but without any kind of ſuſtenance; notwithſtanding which, he was taken out alive. When firſt found in the pit, the ſides of which had fallen in and confined him for the time above mentioned, his eyes were ſo ſwollen and protruded out of their ſockets, that he had a ſhocking appearance; for which reaſon, the people tied a handkerchief round his head. While in this protruded ſtate, however, he was capable of diſtinguiſhing objects; but in a little time his eyes ſunk within their ſockets, and he became quite blind. On being taken out of the pit, he ſeemed for ſome time to be in a way of recovery; but all favourable ſymptoms ſoon vaniſhed, and he expired in three days after his releaſe.

During all the time of his confinement he had only a ſpace to breathe in of three yards in length and two in breadth, in which he lay upon his belly. It communicated indeed with another pit by a paſſage 80 yards in length and about eight or ten inches wide; but as the mouth of the pit into which he deſcended was ſtopped, and the body of earth through which he had dug thrown behind him, no circulation of air could poſſibly take place. The truth of this concluſion was likewiſe evinced by the ſtate of the air in the other pit through which the people entered to dig out the unfortunate ſufferer; for it was there ſo foul, that the candles they carried down with them were immediately extinguiſhed. In this ſtate of the air which ſurrounded him, it is remarkable, that the patient, who was naturally aſthmatic, breathed freely, and continued to do ſo till his death: And on this ſubject Dr Percival makes the following remarks.

4 Conjectures concerning the manner in which it acts.

"As he had been long aſthmatic, we may reaſonably conclude from his ſuffering ſo little, that the commonly received opinion of the *ſuffocating* nature of the mephitis or choke-damp, that it deſtroys the elaſticity of the air, and occaſions a collapſion of the lungs, is without foundation, notwithſtanding all the reſpectable authorities that may be advanced in ſupport of it. Indeed, from the phenomena which attend the extinction of life in thoſe to whom ſuch vapours have proved mortal, it is evident that the poiſon acts chiefly on the nervous ſyſtem. The vital principle ſeems to be arreſted and almoſt inſtantaneouſly deſtroyed; ſometimes even without a ſtruggle, and poſſibly without any antecedent pain. Pliny the elder was found, after the fatal eruption of Mount Veſuvius, exactly in the poſture in which he fell, with the appearance of one aſleep rather than dead. Some perſons killed by foul air in a cellar at Paris, were found ſtiff as ſtatues, with their eyes open, and in the poſture of digging. M. Beaumé relates the hiſtory of a man who was recovered from apparent death produced by a ſimilar cauſe, and who aſſerted that he had neither felt pain nor oppreſſion; but that at the point of time when he was loſing his ſenſes, he experienced a delightful kind of delirium. This account receives ſome confirmation from what Dr Heberden ſays in his lectures on poiſons, that he had ſeen an inſtance in which the fumes of charcoal brought on the ſame kind of delirium that is produced by henbane and other intoxicating poiſons of the vegetable kind. Abbé Fontana breathed a certain portion of inflammable air, not only without inconvenience, but with unuſual pleaſure. He had a facility in dilating the breaſt, and never felt an equally agreeable ſenſation even when he inhaled the pureſt dephlogiſticated air. But he ſuffered greatly in a ſubſequent experiment: for having filled a bladder, containing about 350 cubic inches, with inflammable air, he began to breathe it boldly after diſcharging the atmoſpheric air contained in his lungs by a violent exſpiration. The firſt inſpiration produced a great oppreſſion; towards the middle of the ſecond, he was obſerved to become very pale, and objects appeared confuſed to his eyes: nevertheleſs he ventured on a third; but his ſtrength now failed, ſo that he fell upon his knees, and ſoon afterwards upon the floor. His reſpiration continued to be effected with pain and difficulty, and he did not perfectly recover till the ſucceeding day. In this inſtance ſome degree of palſy was probably induced in the nerves of the lungs by the action of concentrated inflammable air conveyed into the veſicles forcibly emptied of their atmoſpheric air by exſpiration. For, in ordinary reſpiration, about 35 inches of air are inhaled and exhaled; but in a violent exſpiration, about 60 cubic inches may be diſcharged. In the caſe of the unfortunate collier (Travis), it will be remembered, that the air was ſufficiently ſalubrious when he went down into the pit; that by ſtagnation it became gradually noxious; and that his nervous ſyſtem muſt therefore have been progreſſively habituated to its influence. This is conformable to the obſervations of Dr Prieſtley; who found, that if a mouſe can bear the firſt ſhock of being put into a veſſel filled with artificial gas, or if the gas be increaſed by degrees, it will live a conſiderable time in a ſituation that would inſtantly prove fatal to other mice: and he frequently noticed, that when a number of mice had been confined in a given quantity of infected air, a freſh mouſe introduced among them has immediately died in convulſions.

5 Symptoms produced in various perſons who breathed it.

6 Noxious fumes from the quantity of fuel conſumed in large cities.

"It has been found by experiment, that the fumes emitted by almoſt every ſpecies of burning fuel prove fatal to animals, when applied in a ſufficiently concentrated ſtate. I have computed, that 300 tons of coal are every day conſumed in the town of Mancheſter during the winter ſeaſon. The factitious gas generated by its conſumption muſt amount to at leaſt a third part of that quantity; it is probable that the ſmoke proceeding from it conſtitutes another third part; and both together are capable of occupying a ſpace of very wide extent. Now, if it were not for the diſperſion of theſe vapours by the wind, the precipitation of them by rain, and the influence of other cauſes, reſpiration could not be carried on in ſuch circumſtances. And we may obſerve, that froſty weather, which is generally ſerene and without wind, proves extremely oppreſſive, and ſometimes even fatal, to aſthmatic patients, eſpecially in great cities. Indeed the rate of human mortality is nearly in proportion to their magnitude and population. It is evident, therefore, that habit, however it may abate, cannot entirely counteract the baneful effects of bad air; and thoſe will feel its effects the more ſtrongly, in every ſituation, whoſe nervous ſyſtems are endowed with more than ordinary ſenſibility. Such perſons I would caution not to indulge their curioſity in the inſpection of unwholeſome manufactures, nor in viſiting mines, caverns, ſtoves,

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Fixed Air. ſtoves, hoſpitals, or priſons. The late Dr Brown ſuffered very ſeverely by accompanying two foreigners of diſtinction into the duke of Bridgewater's works at Worſley. It happened that they were the firſt who entered the tunnel on that day. The candles which they carried with them were obſerved to burn very dimly; but neither the paſſengers nor the boatmen experienced any difficulty in reſpiration. After remaining in the coal-pits a conſiderable time, they proceeded to Warrington, where Dr Brown was attacked by violent pains, which ſhifted ſuddenly from one part of his body to another; ſmall purple ſpots overſpread his ſkin; his throat became tumefied ſo as to render ſwallowing difficult; and great proſtration of ſtrength, with a low fever, enſued. The doctor was ſubject to the anomalous gout; had once a paralytic complaint of long continuance; and hence we may conclude that his nervous ſyſtem was endowed with peculiar irritability. He was not, however, the only ſufferer; for one of the foreigners was affected with ſimilar petechiæ, but attended with little pain or diſorder."

7 In what manner the atmoſphere may be purified from too great a quantity of fixed air.

Here we may obſerve, that our knowledge of the compoſition of fixed air ſeems to throw ſome light upon the ſubject in queſtion. Dephlogiſticated air and phlogiſton are univerſally allowed to be the component parts; and whether we ſuppoſe, with Mr Delaval, water to be a third ingredient or not, the caſe will ſtill be the ſame; for by whatever means the ſeparation of the phlogiſton can be effected, the air will be rendered pure. This is aſcertained by ſome of Dr Prieſtley's experiments, particularly thoſe related under the article ASTROLOGY, n° 113. where the phlogiſton was plainly ſeparated by the electric ſpark, and the dephlogiſticated air remained in a ſtate of purity. When the atmoſphere is contaminated by a mixture of fixed air, therefore, it may be purified in two very different ways: one is by the abſorption of the gas without any decompoſition, as by lime-water, alkaline ſalts, &c. the other, by the ſeparation of its component parts, by which a portion of it muſt neceſſarily be exchanged for a portion of pure reſpirable air. It is probable that nature purſues both theſe methods in freeing the atmoſphere from this noxious gas: but indeed, whatever method ſhe takes, it is certain that any large portion of atmoſpheric air cannot long be contaminated with this gas, even though ſeemingly in a confined ſituation. This is evident from ſome experiments, where large quantities of fixed air being poured out into the atmoſphere of a room, entirely vaniſhed, ſo that it could not be perceived by the niceſt teſt, in half an hour. As we are not yet acquainted with the action of atmoſpheric and fixed air upon each other, when the former is in large proportion, it naturally becomes a matter of ſuſpicion whether the fixed air has not a natural tendency to decompoſition, and conſequently to render the air ſalutary after it has for a ſhort time rendered it noxious. This is certainly the caſe when it meets with vegetables; for many of them are ſupported by every kind of noxious air. In caſes where many animals are confined together, it is probable that their death is not occaſioned by the *fixed air* produced from their reſpiration, but by that which is called *phlogiſticated*, or moſt probably by the total deprivation of the vital principle ſupplied by the dephlogiſticated kind. The perſpiration of animal bodies of itſelf ſupplies a reſource for the abſorption of pure fixed air; for all animal exhalations are of the alkaline kind, and therefore are capable of neutralizing this kind of gas. This is evident from a circumſtance generally unnoticed, but which is obvious to every one who chooſes to give himſelf the trouble of inquiry. In waſhing over the walls of rooms with lime and water, which is the firſt preparatory operation for painting, a violent ſmell of volatile alkali is perceptible; and there can be no doubt that this proceeds from a decompoſition of the neutral ſalt formed by the union of the fixed air, produced in reſpiration, with the ſubtile phlogiſtic and alkaline effluvia which riſe in perſpiration. To this cauſe we may in a great meaſure aſcribe the preſervation of the Ruſſians, which Dr Percival alſo takes notice of, but aſcribes it to an *accommodating* quality of the human frame by which it can ſubſiſt in ſo great a variety of circumſtances. "A Ruſſian boor (ſays he), in the winter ſeaſon, experiences all the varieties of air, heat, and cold, without any inconvenience. When labouring out of doors, he is expoſed to the intenſity of froſt and ſnow; when he retires in the evening to his hut, which conſiſts only of one cloſe apartment, never ventilated during ſix months, he feeds upon ſalted fiſh or fleſh, and afterwards repoſes on a greaſy mattraſs placed over an oven in which billets of wood are burned. In this ſituation he is literally ſtewed, with his whole family, who live in a conſtant ſteam, not offenſive to themſelves, but ſcarcely ſupportable by a ſtranger. The atmoſphere of a crowded town muſt, in many reſpects, reſemble the foul air of a Ruſſian cottage; yet thouſands enjoy in it a conſiderable ſhare of health."

8 Of the quantity of vital air requiſite for the ſupport of human life in different ſituations.

On this we muſt further obſerve, that in certain caſes the human body requires much more of the vital principle ſupplied by dephlogiſticated air to ſupport life than in others. This is particularly the caſe when much motion and exerciſe are uſed; ſo that the computations made of the quantity of air conſumed by a human creature in a minute, muſt be very vague and variable. This was evident in M. Sauſſure's journey to the top of mount Blanc, where, beſides the general rarefaction of the atmoſphere, there was a great mixture of fixed air, as appeared by the precipitation of lime-water when expoſed to the action of the common air. Here, though always ſomewhat uneaſy, yet he was comparatively well while he remanied in a ſtate of inaction; but felt exceſſive trouble on being obliged to exert his ſtrength, inſomuch that he could ſcarce accompliſh in four hours and an half, the experiments which at the foot of the mountain he would have eaſily done in three. "While I remained perfectly ſtill (ſays he), I experienced but little uneaſineſs, more than a ſlight oppreſſion about the heart; but on the ſmalleſt bodily exertion, or when I fixed my attention upon any object for ſome moments together, particularly when I preſſed my cheſt in the act of ſtooping, I was obliged to reſt and pant for ſome minutes."

From this account we muſt naturally conclude, that in caſes where the powers of life and circulation are ſtrong and vigorous, a great quantity of vital principle is requiſite to ſupport life; and the ſudden deprivation of any conſiderable part of it may occaſion death, even though

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Fixed Air.

though as much ſtill remain as would be ſufficient to ſupport life in other circumſtances. Hence, if a ſtrong and healthy animal is ſuddenly plunged into an atmoſphere loaded with mephitic or other noxious vapours, it will very frequently die in a moment; while the mere circumſtance of debility cauſes others to bear the ſame ſituation with impunity. In theſe circumſtances a ſudden expoſure to very pure air might even be fatal to an animal very long confined in ſuch as is noxious, juſt as fire may be put out by too violent a blaſt of air. Hence we may underſtand why conſumptive perſons are not recovered, but often made manifeſtly worſe, by being brought into purer air; and in all probability the death of Travis was haſtened by his ſudden removal into the open atmoſphere. His remaining alive, therefore, for ſuch a length of time in circumſtances ſo very unfavourable, we are to attribute in a particular manner to the extreme debility of the vital powers, by which an exceedingly ſmall quantity of dephlogiſticated air was required to ſupport them. We are beſides to take into conſideration, that in certain caſes the air will impart nouriſhment, even to the bodies of animals as well as vegetables. Under the article ABSTINENCE, inſtances are brought of animal bodies being augmented in bulk without any nouriſhment taken in by the mouth. In ſuch caſes we muſt conclude, that the nouriſhment came from the phlogiſtic particles diſperſed through it. It is not impoſſible, therefore, that in ſome caſes the human body, by abſorbing from the atmoſphere the phlogiſton which it had juſt emitted by reſpiration, may purify the air which it had juſt before contaminated: and thus life might be prolonged in the caſe of Travis, who was not only deſtitute of air proper for reſpiration, but of food and drink alſo. In caſes of famine, it is manifeſt that there is a great abſorption from the atmoſphere. Thus a negro who was gibbeted at Charleſtown, and had nothing given him afterwards, voided a large quantity of urine every morning; and in caſes of lientery and diabetes, the quantity of evacuations greatly exceeds the nouriſhment taken in by the mouth. On this principle, perhaps, we may account for that very ſtrange phenomenon of animals being found alive in the heart of ſolid bodies, where there could be no poſſibility of any connection with the external atmoſphere. Inſtances of theſe are given under the article ANIMALCULE, n° 57.

9 Why ſudden changes from noxious to pure air are dangerous.

10 The human body may ſometimes abſorb nouriſhment from the atmoſphere.

11 Effects of fixed air on vegetation.

We ſhall conclude this part of our ſubject with ſome obſervations made by Mr Henry on the effects of fixed air on vegetation. Experiments on this ſubject had been made firſt by Dr Prieſtley, and afterwards by Dr Percival, but with very different reſults; the former concluding that fixed air was prejudicial to the growth of vegetables, and Dr Percival that it was favourable to it. Mr Henry endeavours to reconcile the difference. He ſuppoſes Dr Percival's meaning to be, not that fixed air, in its pure ſtate and ſtagnant, was favourable to vegetables immerſed in it; but that gradually applied, and in a continued ſtream, while the plants at the ſame time are not confined from the common air, do receive from fixed air ſuch a proportion of nouriſhment as is ſufficient for their temporary ſupport, even when removed from every other means of being ſupplied with food.

Dr Prieſtley, in his third volume on Air, acknowledges the fairneſs and candour with which the experiments of Dr Percival were related, but ſuppoſes there muſt have been ſome miſtake; particularly, as the air was produced by Dr Nooth's apparatus, he thinks the quantity could not be ſo great as was imagined. In ſupport of this opinion he mentioned a great number of experiments, in which fixed air was tried in all proportions, from a ſtate of purity to a mixture of one-third of fixed air with ſeven-eighths of common air; and in all theſe the fixed air was found to be injurious, and to deſtroy the colour of roſe-leaves.

Fixed Air.

From ſome experiments made by Mr Henry himſelf, the contrary opinion ſeemed to be eſtabliſhed. By theſe it appeared that a ſtrawberry plant had not only been preſerved alive, expoſed in the middle of Dr Nooth's machine to copious ſtreams of fixed air, from the 23d of April to the 14th of May, but that the bloſſoms, which were only budded when put into the machine, had actually expanded; a ſtrong proof that the plant had continued to vegetate. It was ſtill alive, but in a ſituation ſomewhat drooping; and happening to be cruſhed on taking it out of the apparatus, it was thrown away altogether. Two ſprigs of mint, with ſome earth looſely adhering to their roots, were ſubjected to a ſimilar experiment from the 1ſt to the 12th of September; the one having a continual current of fixed air applied to it, but the other being left to the operation of common atmoſpherical air. The roots of both were cut off on the 7th: that in common air exhibited ſymptoms of decay on the 12th; but the other continued freſh for more than a week after the other had been decayed almoſt to the top.

On the 11th of April 1777, the weather being very cold and backward, Mr Henry filled the middle part of Dr Nooth's machine entirely with fixed air, by firſt filling it with water, inverting it in the ſame fluid, ſtopping up the capillary tubes, and then driving out the water from the veſſel by a ſtream of fixed air from an effervеſcing mixture. The middle was then immediately placed in the lower part of the machine, containing an effervеſcing mixture alſo, which had been working for ſeveral minutes; and a crimſon polyanthus was introduced into the middle part, and ſuſpended by a ſtring. In paſſing through the mouth of the veſſel, the petals were compreſſed, and one or two received ſome damage. A young ſprig of mint, with its root, was introduced the ſame day, and into the ſame veſſel; while a ſimilar ſprig, as a ſtandard, was placed in a large glaſs decanter. The polyanthus began to droop on the 15th, and was taken out next day ſhrivelled but not diſcoloured. The mint, when examined on the 12th, was apparently more freſh than when firſt put into the veſſel with fixed air; the next day two young ſhoots appeared ſtill more vigorous. On the 15th its appearance was more vivid than that in common air; but next day it was taken out quite dead. This ſudden change, however, our author ſuppoſes to have been owing to the machine having no valve; and having been violently ſhaken, he ſuſpected that ſome of the vitriolic acid had been forced up through the tubes; for the moiſture on the inſide of the middle part was found to be more acid than it ſhould have been by fixed air alone.

The experiment was repeated on the 26th of April with a polyanthus plant with its root and flowers, which,

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Fixed Air. which, with several others, were put into the middle part of Nooth's machine. Here it continued till the 10th of May. The effervescence was frequently renewed; for the first four days twice, and then once a-day; but the discharge of air was continually going on. It continued ten days without any signs of decay; and when taken out of the machine on the 14th day, though some of the older flowers were fading, the others were as fresh and blooming as when put into the vessel; more so than those which had been purchased on the same day, and planted in the garden. The body of the plant was green, succulent, and undecayed. The air extinguished flame. On trial it was found to be one-third fixed air; and during several days, the proportion of fixed air must have been larger.

But, when *confined* in vessels of fixed air, or even in Nooth's machine, with the upper part and grooved stopper put on, plants died sooner than in common air. The air measured was seven-eighths fixed air.

12 Phlogiston the food of plants.

"I am informed (says Mr Henry), that an ingenious philosopher of Geneva has made some experiments, by which he has proved, not only that phlogiston is the food of plants, but also, to the satisfaction of Dr Priestley, that it is in the form of fixed air, in proper proportion and place, that this pabulum is administered. In regard to the animal body, it would surely be wrong to say that nothing was nutritious or salutary to it which it could not bear to receive unmixed or undiluted. Why then may we not suppose, that though fixed air, when pure, may be fatal to plants confined in it, and excluded from communication with the external air; yet, when applied in a proper dose, and to plants enjoying a free intercourse with the atmosphere, it may have a contrary effect, and serve to nourish and support them? But in Dr Priestley's experiments, this free intercourse does not appear to have been allowed; and herein, I apprehend, consisted the cause of the difference in our results.

"At that time the constitution of fixed air was not understood. It is now generally allowed to be formed by a combination of phlogiston with the pure part of atmospheric air. The first of these ingredients has been proved by Dr Priestley and others to be favourable to vegetation; while plants droop and decay when exposed to the action of the latter. It should further appear from Dr Ingenhousz's experiments, that plants have the power of separating phlogiston from common air, applying it to their nurture (a), and throwing out the pure or dephlogisticated residuum as excrementitious. Now allowing, what is highly probable, that they have a similar power of decomposing fixed air, and of applying and rejecting its constituent parts, our method of conducting the experiments was not injurious to the process; whereas, when confined in close vessels, as by Dr Priestley, the plants would be suffocated in a manner reversed to what would happen to an animal. For as in that case, from a want of communication with the atmosphere, as necessary to carry off the phlogistic air from the lungs (according to the beautiful theory of respiration advanced and so well supported by Dr Priestley), the animal must perish; so, in the other instance, the plant would die if cut off from the air of the atmosphere in such a manner that the pure air excreted by its vessels would not be conveyed from it. For in these circumstances, this fluid, so salutary to animal but destructive to vegetable life, must be accumulated in the body of the plant; and its functions being thus impeded, death is the necessary consequence."

Fixed Air.

13 Method of impregnating water or other liquors in large quantities with fixed air.

As fixed air is now an article of the materia medica, a method of obtaining it readily and in large quantity becomes an object of considerable consequence. Mr Henry, who has proved that fixed air is the proper base of ferments, and the immediate cause of fermentation †, describes an apparatus for impregnating wort or other fermentable liquors with it. This apparatus is represented Plate CXCIII.

† See Fermentation.

A A, Fig. 1, represents the cask in which the wort is to be impregnated; *d d*, the strings by which the air-vessel is to be let down.

Fig. 2. *D D*, The air-vessel, similar to the bottom part of Dr Nooth's glass machine, to be made of glass or earthen ware. *c*, A glass-stopper ground in to fit the mouth of the vessel, having a number of capillary tubes running from bottom to top in a diverging direction, so as to spread the air in its passage through the liquor.

Fig. 3. The stopper viewed separately to show the capillary tubes.

The method of using this apparatus is obvious from an inspection of the figure; but at the same time it must be equally evident, that it cannot be applied where any very large quantity is to be impregnated. Where great quantities of fixed air are required, we must also use great quantities of fermenting materials; and it would be inconvenient in the highest degree to immerge these in the liquor to be fermented; not to mention, that where large quantities of this kind of materials are mixed, they ought frequently to be stirred or shaken, lest they should concrete into hard lumps; while at the same time they are often apt to swell, and would thus endanger the spoiling of the liquor altogether. It must also be remarked, that any liquid receives an impregnation of fixed air more readily from the surface than by blowing it through the mass of liquid. The apparatus represented fig. 4. therefore seems preferable to that of Mr Henry, as capable of being extended indefinitely almost without any additional trouble. *A B C D* represents a large wooden cask filled with materials to the height represented by *k k*. *E* is a large flat cooler for holding the liquor to be impregnated. This vessel is to be closely covered, and may be conveniently made of lead, having a wooden top, the edges of which are closely luted all round with a mixture of salad oil and finely powdered chalk. *f*, Represents a tin pipe, about an inch in diameter, by which a communication is made between the cask and cooler for the transmission of the fixed air. *g b*, Is a wooden axis passing quite through the cask from top to bottom, and moveable on a centre *b*, having a strong handle at top, to turn it in order to stir the mixture. *i i i i*, Are four cross blades fixed into the axis, which, in consequence of turning the handle, stir and raise a great commotion in the liquor contained in the cask. *m*, Is a large hole stopped with a wooden plug, by which the materials may be put in or taken out; and for this last purpose a kind of ladle with an upright

(a) See this further discussed under the article AEROLOGY, n° 51, 52.

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Fire-Ship.

Plate CXCIII.

Fire-Place.

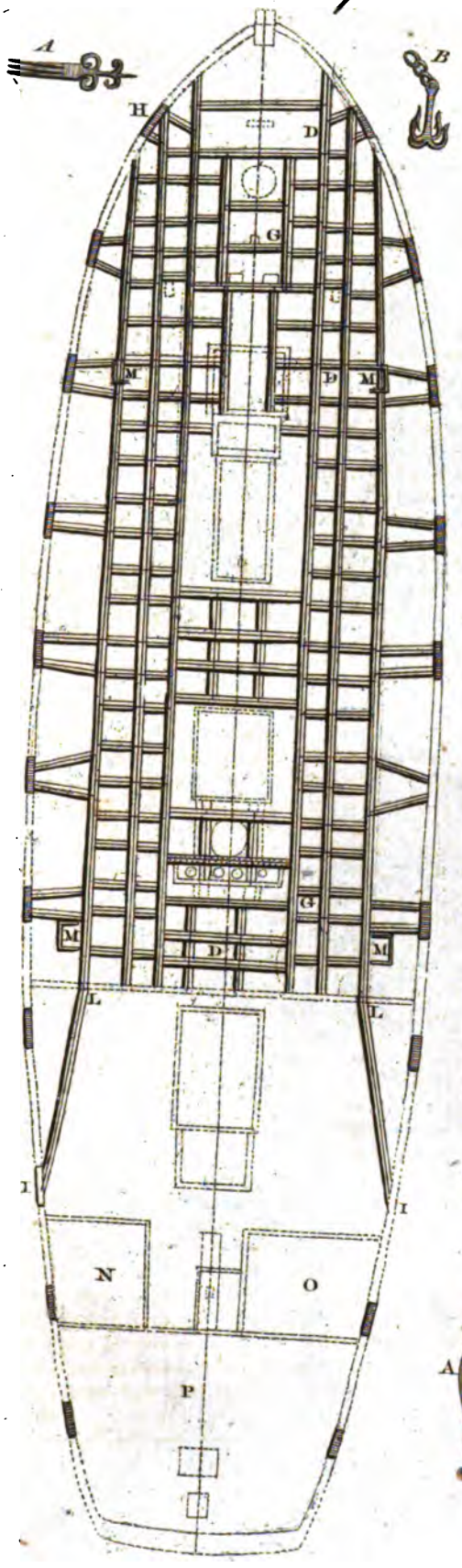


Fig. 1.

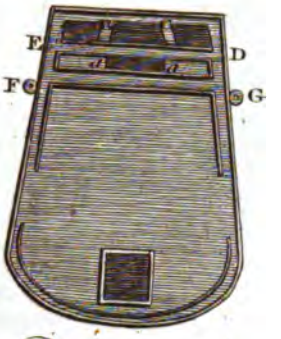


Fig. 2.

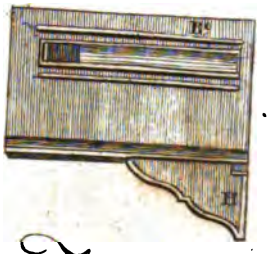


Fig. 3.

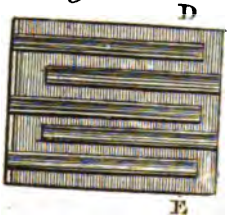


Fig. 4.

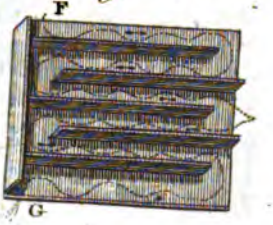
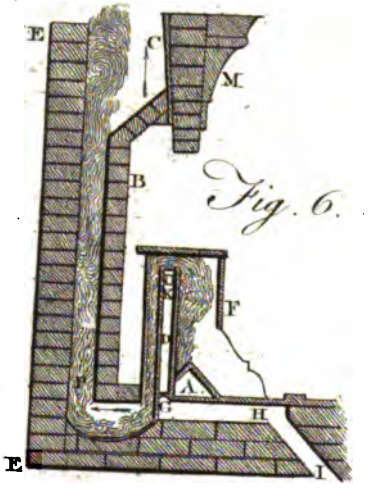


Fig. 5.

Fig. 6.



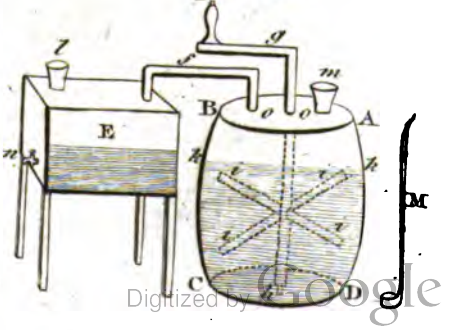
Fixed-Air.

Fig. 1.

Fig. 3.

Fig. 2.

Fig. 4.



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A. Bell Prin. Wal. Sculptor fecit.

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Fixed Stars ‖ Flags.

ſtem as *M* may be made uſe of. *l*, Is a plug ſtopping up a hole in the lid of the cooler *E*, by which the liquor to be impregnated may be put in, and let out again by the cock *n*.

In this apparatus it is evident, that when an effervescing mixture is put into the caſk, the fixed air muſt paſs through the tube *f* into the cooler, where it will be abſorbed by the liquor as faſt as it is emitted by the materials; but in order to prevent it from eſcaping, all the junctures muſt be luted carefully with the mixture of ſalad oil and chalk already mentioned, which is both ſufficiently adheſive, and remaining ſoft for a long time, may be inſtantaneouſly repaired where it happens to be broken. When the effervescence begins to turn languid, it may inſtantly be quickened by turning the handle; but this will diſturb the luting at *o o*, which muſt therefore be clapped cloſe all round the axis as ſoon as the matter is ſufficiently ſtirred.

Fixed Stars, are ſuch as conſtantly retain the ſame poſition and diſtance with reſpect to each other *; by which they are contradiſtinguiſhed from *erratic* or *wandering* ſtars, which are continually ſhifting their ſituation and diſtance.—The fixed ſtars are what we properly and abſolutely call *ſtars*: the reſt have their peculiar denominations of *planet* and *comet*. See Astronomy, per *Index*.

* See *Aſtronomy*, n° 192.

FIXITY, or Fixedness, in chemiſtry, is in a peculiar manner uſed for the affection oppoſite to volatility; *i. e.* the property whereby bodies bear the action of the fire, without being diſſipated in fumes.

FLACCUS (Caius Valerius), an ancient Latin poet, of whom we have very imperfect accounts remaining. He wrote a poem on the Argonautic expedition; of which, however, he did not live to finiſh the eighth book, dying at about 30 years of age. John Baptiſta Pius, an Italian poet, completed the eighth book of the Argonautics; and added two more, from the fourth of Apollonius; which ſupplement was firſt added to Aldus's edition in 1523.

FLAGS, in the army, are ſmall banners of diſtinction ſtuck in the baggage-waggons, to diſtinguiſh the baggage of one brigade from another, and of one battalion from another; that they may be marſhalled by the waggon-maſter general according to the rank of their brigades, to avoid the confuſion that might otherwiſe ariſe.

Flag, in the marine, a certain banner or ſtandard, by which an admiral is diſtinguiſhed at ſea from the inferior ſhips of his ſquadron; alſo the colours by which one nation is diſtinguiſhed from another. See Plate CXCIV.

In the Britiſh navy, flags are either red, white, or blue; and are diſplayed from the top of the main-maſt, fore-maſt, or mizen-maſt, according to the rank of the admiral. When a flag is diſplayed from the flag-ſtaff on the main-maſt, the officer diſtinguiſhed thereby is known to be an admiral; when from the fore-maſt, a vice-admiral; and when from the mizen-maſt, a rear-admiral.

The firſt flag in Great Britain is the royal ſtandard, which is only to be hoiſted when the king or queen are on board the veſſel: the ſecond is that of the anchor of hope, which characteriſes the lord high admiral, or lords commiſſioners of the admiralty: and the third is the union-flag, in which the croſſes of St George and St Andrew are blended. This laſt is appropriated to the admiral of the fleet, who is the firſt military officer under the lord high admiral.

Flags, Flagellantes.

The next flag after the union is that of the white ſquadron, at the main-maſt head; and the laſt, which characteriſes an admiral, is the blue, at the ſame maſt-head.

For a vice-admiral, the firſt flag is the red, the ſecond the white, the third the blue, at the flag-ſtaff on the fore-maſt.

The ſame order proceeds with regard to the rear-admirals, whoſe flags are hoiſted on the top of the mizen-maſt: the loweſt flag in our navy is accordingly the blue on the mizen-maſt.

To Lower or Strike the Flag, in the marine, is to pull it down upon the cap, or to take it in, out of the reſpect, or ſubmiſſion, due from all ſhips or fleets inferior to thoſe any way juſtly their ſuperiors. To lower or ſtrike the flag in an engagement is a ſign of yielding.

The way of leading a ſhip in triumph is to tie the flags to the ſhrouds, or the gallery, in the hind-part of the ſhip, and let them hang down towards the water, and to tow the veſſels by the ſtern. Livy relates, that this was the way the Romans uſed thoſe of Carthage.

To Heave out the Flag, is to put out or put abroad the flag.

To Hang out the White Flag, is to aſk quarter; or it ſhows, when a veſſel is arrived on a coaſt, that it has no hoſtile intention, but comes to trade, or the like. The red flag is a ſign of defiance, and battle.

Flag is alſo uſed for ſedge, a kind of ruſh.

Corn-Flag. See Gladiolus.

Sweet-ſcented Flag. See Acorus.

Flag-Officers, thoſe who command the ſeveral ſquadrons of a fleet; ſuch are the admirals, vice-admirals, and rear-admirals.

The flag-officers in our pay, are the admiral, vice-admiral, and real admiral, of the white, red, and blue. See Admiral, Flag, and Fleet.

Flag-Ship, a ſhip commanded by a general or flag-officer, who has a right to carry a flag, in contradiſtinction to the ſecondary veſſels under the command thereof.

Flag-Stone, a genus of argillaceous earths, of a grey, yellowiſh, or reddiſh-white colour; not giving fire with ſteel, nor effervescing with acids. Its ſpecific gravity is from 2600 to 2780. Sometimes it is found compact, and ſometimes like the argillaceous grit; in which caſe its gravity is leſs. Its general uſe is for flooring houſes, though ſometimes it is made uſe of for covering them. There is alſo a calcareous flag-ſtone found near Woodſtock in England. It is of a yellowiſh-white colour, and moderately hard, containing a little iron. Its ſpecific gravity is 2585.

FLAGELLANTES, a ſect of wild fanatics who chaſtiſed and diſciplined themſelves with whips in public.

The ſect of the Flagellantes had its riſe in Italy in the year 1260; its author was one Rainier a hermit; and it was propagated from hence through almoſt all the countries of Europe. It was in all probability no more than the effect of an indiſcreet zeal. A great number of perſons of all ages and ſexes made proceſ-

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Flagellantes || Flake.

sions, walking two by two with their shoulders bare, which they whipped till the blood ran down, in order to obtain mercy from God, and appease his indignation against the wickedness of the age. They were then called the *devout*; and having established a superior, he was called the *general of the devotion*. Though the primitive Flagellantes were exemplary in point of morals, yet they were joined by a turbulent rabble, who were infected with the most ridiculous and impious opinions; so that the emperors and pontiffs thought proper to put an end to this religious phrensy, by declaring all devout whipping contrary to the divine law, and prejudicial to the soul's eternal interest.

However, this sect revived in Germany towards the middle of the next century, and rambling through many provinces, occasioned great disturbances. They held, among other things, that flagellation was of equal virtue with baptism and the other sacraments; that the forgiveness of all sins was to be obtained by it from God without the merits of Jesus Christ; that the old law of Christ was soon to be abolished, and that a new law enjoining the baptism of blood to be administered by whipping was to be substituted in its place: upon which Clement VII. by an injudicious as well as unrighteous policy, thundered out anathemas against the Flagellantes, who were burnt by the inquisitors in several places; but they were not easily extirpated. They appeared again in Thuringia and Lower Saxony in the 15th century; and rejected not only the sacraments, but every branch of external worship; and placed their only hopes of salvation in faith and flagellation, to which they added other strange doctrines concerning evil spirits. Their leader Conrad Schmidt and many others were committed to the flames by German inquisitors in and after the year 1414.

FLAGEOLET, or Flajolet, a little flute, used chiefly by shepherds and country-people. It is made of box or other hard wood, and sometimes of ivory; and has six holes besides that at the bottom, the mouth-piece, and that behind the neck.

FLAIL, an instrument for threshing corn. It consists of the following parts. 1. The hand-staff, or piece held in the thresher's hand. 2. The swiple, or that part which strikes out the corn. 3. The caplins, or strong double leathers, made fast to the tops of the hand-staff and swiple. 4. The middle-band, being the leather thong or fish skin that ties the caplins together.

FLAIR, in sea-language. The seamen say that the work doth flair over, when a ship being housed in near the water, so that the work hangs over a little too much, and thus is let out broader aloft than the due proportion will allow.

FLAKE, in the cod-fishery, a sort of scaffold or platform, made of hurdles, and supported by stanchions, and used for drying cod-fish in Newfoundland. These flakes are usually placed near the shores of fishing-harbours.

Flake, in gardening, a name given by the florists to a sort of carnations which are of two colours only, and have very large stripes, all of them going quite through the leaves.

White Flake, in painting, is lead corroded by means of the pressing of grapes, or a ceruse prepared by the acid of grapes. It is brought here from Italy; and far surpasses, both with regard to the purity of its whiteness and the certainty of its standing, all the ceruse or white lead made with us in common. It is used in oil and varnish painting for all purposes where a very clean white is required. The white flake should be procured in lumps as it is brought over, and levigated by those who use it; because that which the colourmen sell in a prepared state is levigated and mixed up with starch, and often with white lead, and worse sophistications. Flambeau Flamborough-Head.

FLAMBEAU, or Flamboy, a luminary made of several thick wicks, covered over with wax, serving to burn at nights in the streets; as also at funeral processions, illuminations, &c.

Flambeaux differ from links, torches, and tapers.—They are made square, sometimes of white wax and sometimes of yellow. They usually consist of four wicks or branches near an inch thick, and about three feet long, made of a sort of coarse hempen yarn half twisted. They are made with the ladle much as torches or tapers are; *viz.* by first pouring the melted wax on the top of the several suspended wicks, and letting it run down to the bottom. This they repeat twice. After each wick has thus got its proper cover of wax, they lay them to dry; then roll them on a table, and so join four of them together by means of a red-hot iron. When joined, they pour on more wax till the flambeau is brought to the size required, which is usually from a pound and half to three pounds. The last thing is to finish their form or outside, which they do with a kind of polishing instrument of wood by running it along all the angles formed by the union of the branches.

The flambeaux of the ancients were different from ours. They were made of woods dried in furnaces or otherwise. They used divers kinds of wood for this purpose; the wood most usual was pine. Pliny says, that in his time they frequently also burnt oak, elm, and hazle. In the seventh book of the Æneid, mention is made of a flambeau of pine; and Servius on that passage remarks, that they also made them of the cornel-tree.

FLAMBOROUGH-head, in geography, a cape or promontory on the eastern coast of Yorkshire, five miles east of Burlington, and 216 from London. E. Long. 20°. N. Lat. 54, 15.—This was the *Flamburg* of the Saxons; so called, as some think, from the lights made on it to direct the landing of Ida, who in 547 joined his countrymen in these parts with a large reinforcement from Germany, and founded the kingdom of Northumberland. In the time of Edward the Confessor, Flamborough was one of the manors of Harold, Earl of the West Saxons, afterwards king of England. On his death, the Conqueror gave it to Hugh Lupus; who, in perpetual alms, bestowed it on the monastery of Whitby.—The town is on the north side; and consists of about 150 small houses, entirely inhabited by fishermen; few of whom, as is said, die in their beds, but meet their fate in the element they are so conversant in. The cliffs of the Head are of a tremendous height and amazing grandeur. Beneath are several vast caverns; some closed at the end, others pervious, formed with a natural arch. In some places the rocks are insulated, and of a pyramidal figure, soaring up to a vast height. The bases of most are solid, but in some pierced through and arched. The colour

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Flame. colour of all these rocks is white, from the dung of the innumerable flocks of migratory birds, which quite cover the face of them, filling every little projection, every hole that will give them leave to rest.

FLAME, is a general name for every kind of luminous vapour, provided the light it emits hath any considerable degree of intensity. The name *flame*, however, is most generally applied to such as are of a conical figure, like those arising from our common fires; without this, they are commonly called *luminous vapours*, or simply *lights*.

According to Sir Isaac Newton, flame is only *red-hot smoke*, or the vapour of any substance raised from it by fire, and heated to such a degree as to emit light copiously. This definition seems to be the most accurate and expressive of any. It is certain, that bodies are capable of emitting flame only in proportion to the quantity of vapour that rises from them. Thus wood, coals, &c. which emit a great quantity of vapour, flame violently; while lead, tin, &c. which emit but a small fume, can scarce be perceived to flame at all.

This rule, however, is by no means to be depended upon in all cases. Some vapours *seem* to be in their own nature uninflammable, and capable of extinguishing flame; as those of water, the mineral acids, sal-ammoniac, arsenic, &c.: while others take fire on the slightest approach of a flaming substance; such as ether, spirit of wine, &c. These last mentioned substances also exhibit a remarkable phenomenon; namely, that they cannot be made to flame without the approach of some substance actually in flames beforehand. Thus, spirit of wine poured on a red-hot iron, though instantly dissipated in vapour, will not flame; but if a burning candle touches its surface, the whole is set in a flame at once. The case is otherwise with oils, especially those of the grosser kind; for their vapours will readily be changed into flame by the mere increase of heat, without the approach of any flaming substance.

There is, however, no kind of vapour, perhaps, that is incapable of being converted into flame, provided it is exposed to a sufficient degree of heat. Thus the vapour of water made to pass through burning coals produces an exceedingly strong and bright flame.—It is remarkable, that this kind of vapour seems to be more powerful than almost any other in absorbing heat, and detaining it in a latent state. Dr Black hath shown, that when any quantity of aqueous vapour is condensed, more heat will be separated from it than would have been sufficient to heat an equal bulk of iron red-hot.—It is most probably to this property which all vapours have of absorbing heat, and detaining it in a latent state, that we are to attribute the phenomena of flame, and also the exceeding great elasticity of steam. It is certain, that vapours, of water at least, have a much greater power of absorbing and retaining heat, than the water from which they are raised. In open vessels, water cannot be heated more than 212 degrees of Fahrenheit's thermometer; but in Papin's digester, where the vapour is forcibly confined, it has been heated to 400 of the same degrees; and, no doubt, might have been heated a great deal more, had the vessels been strong enough to bear the expansile force of the steam. On opening the vessels, however, the excess of heat was found to have resided entirely in the vapour; for the water in the vessel very soon sunk down to 212°, while the steam issued forth with great violence. Flame.

From these experiments it appears, that the steam of water, after it has absorbed as much heat in a latent state as it can contain, continues to absorb, or detain among its particles, an unlimited quantity of sensible heat; and if the steam could be confined till this quantity became great enough to be visible by its emission of light, there cannot be the least doubt that the vapour would then be converted into flame.

In what manner the heat is detained among the particles of steam, is perhaps impossible to be explained; but to this heat we must undoubtedly ascribe the violent expansive force of steam of every kind. It seems probable, that when smoke is converted into flame, the latent heat with which the vapour had combined, or rather that which made an essential part of it, breaks forth, and adds to the quantity of sensible heat which is already present. This seems probable, from the sudden explosion with which all flames break out. If a vessel full of oil is set over the fire, a smoke or vapour begins to arise from it; which grows gradually thicker and thicker; and at last begins to shine in some places very near the surface of the oil, like an electric light, or sulphur just kindled. At this time the oil is very hot, as well as the steam which issues from it. But this last is continually giving off its sensible heat into the atmosphere; so that at the distance of an inch or two from the surface of the oil, the heat of the steam will not exceed 400 degrees of Fahrenheit, or perhaps may not be so much; but if a burning candle is held in the steam for a moment, the whole is immediately converted into flame, with something like an explosion; after which, the oil burns quietly until it is all consumed. The flame, as soon as it appears, is not only much hotter than the steam from whence it was produced, but even than the oil which lies below it. Whence, then, has this sudden and great increase of heat arisen? It could not be the *sensible* heat of the vapour, for that was greatly inferior; nor could it be communicated from the oil, for that could communicate no more than it had to itself. The candle, indeed, would communicate a quantity of heat to the vapour which touched its flame; but it is impossible that this quantity should extend permanently over a surface perhaps 100 times larger than the flame of the candle, in such a manner as to make every part of that surface equally hot with the flame of the candle itself; for this would be to suppose it to communicate 100 times more heat than really was in it. The heat therefore must have originally resided in the vapour itself: and as, in the freezing of water, its latent heat is extricated and becomes sensible, and the water thereupon loses its fluidity; so, in the accension of vapour, the latent heat breaks forth with a bright flash, and the vapour is then totally decomposed, and converted into soot, ashes, or water, according to the different nature of the substances which produce it, or according to the intensity of the heat.—Several other hypotheses have been invented to solve the phenomena of burning and flaming bodies; for an account of which, see the articles IGNITION, PHLOGISTON, &c.

Flames are of different colours, according to the substances from which they are produced. Thus, the

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Flamen ‖ Flaminius.

flame of ſulphur and ſpirit of wine is blue; the flame of nitre and zinc, of a bright white; that of copper, of a greeniſh blue, &c.—Theſe varieties afford an opportunity of making a number of agreeable repreſentations in fire-works, which could not be done if the flame produced from every different ſubſtance was of the ſame colour. See PYROTECHNICS.

FLAMEN, in Roman antiquity, the name of an order of prieſts, inſtituted by Romulus or Numa; authors not being agreed on this head.

They were originally only three, viz. the *Flamen Dialis, Flamen Martialis, and Flamen Quirinalis*. The Flamen Dialis was ſacred to Jupiter, and a perſon of the higheſt conſequence and authority in the ſtate. He diſcharged ſeveral religious duties which properly belonged to the kings, and was honoured with many eminent privileges beyond all other officers, but was obliged to obſerve ſeveral ſuperſtitious reſtraints. The Flamen Martialis was ſacred to Mars, and was ordained to inſpect the rites of that god. The Flamen Quirinalis was ſacred to, and ſuperintended the rites of, Quirinus Romulus. The Flamines laſt mentioned, though of high authority, were much inferior to the Flamen Dialis. All three were choſen by the people, and conſecrated by the Pontifex Maximus.—In latter times ſeveral prieſts of the ſame order and name were added to them, but inferior in power. The whole number at laſt amounted to 15: the three firſt of whom were ſenators, and called *Flamines majores*; the other 12, taken from among the people, being denominated *Flamines minores*.—Some authors tell us the Romans had a Flamen for every deity they worſhipped. The greater Flamines wore the robe edged with purple, like the great magiſtrates; had an ivory chair, and a ſeat in the ſenate. They wore a little band of thread about their heads, whence their name is ſaid to be derived, *Quaſi Filamines*.—Wife of the Flamen Dialis was called *Flaminica*, and wore a flame coloured habit, on which was painted a thunder-bolt, and above her head-dreſs ſhe had green oak boughs, to indicate that ſhe belonged to Jupiter the thunderer, to whom the oak was ſacred. The Flamines wore each of them a hat or cap called *Flammeum* or *Apex*.

FLAMINGO, in ornithology. See PHOENICOPTERUS.

FLAMINIUS, or FLAMININUS, (T. Q.) a celebrated Roman raiſed to the conſulſhip in the year of Rome 554, though under the age of 30. He was trained in the art of war againſt Hannibal; and he ſhowed himſelf capable in every reſpect to diſcharge with honour the great office with which he was entruſted. He was ſent at the head of the Roman troops againſt Philip king of Macedonia, and in his expedition he met with uncommon ſucceſs. The Greeks gradually declared themſelves his firmeſt ſupporters; and he totally defeated Philip on the confines of Epirus, and made all Locris, Phocis, and Theſſaly, tributary to the Roman power. He granted peace to the conquered monarch, and proclaimed all Greece free and independent at the Iſthmian games. This celebrated action procured the name of Patrons of Greece to the Romans, and inſenſibly paved their way to univerſal dominion. Flaminius behaved among them with the greateſt policy; by his ready compliance to their national cuſtoms and prejudices, he gained uncommon popularity, and received the name of father and deliverer of Greece. He was afterwards ſent ambaſſador to king Pruſias, who had given refuge to Hannibal; and there his prudence and artifice haſtened out of the world a man who had long been the terror of the Romans. Flaminius was found dead in his bed, after a life ſpent in the greateſt glory, in which he had imitated with ſucceſs the virtues of his model Scipio.

Flaminius ‖ Flamſteed.

FLAMINIUS, or FLAMINIO, (Mark Anthony), one of the beſt Latin poets in the 16th century, of Imola in Italy, ſon and grandſon of very learned men. The pope had choſen him ſecretary to the council in 1545; but he refuſed that employment, becauſe, favouring the new opinions, he would not employ his pen in an aſſembly where he knew theſe opinions were to be condemned.—He paraphraſed 30 of the pſalms in Latin verſe, and alſo wrote notes on the pſalms; and ſome letters and poems which are eſteemed. He died at Rome in 1550.

FLAMSTED, a town of Hertfordſhire in England, 5 miles from St Alban's and Dunſtable, ſtands on the river Verlam, and was of old called Verlamſtede. The land hereabouts is a clay ſo thickly mixed with flints, that, after a ſhower, nothing appears but a heap of ſtones; and yet it bears very good corn even in dry ſummers. This fertility is imputed to a warmth in the flint, which preſerves it from cold in the winter; and to its cloſeneſs, which keeps it from the ſcorching rays of the ſun in the ſummer. Edward VI. when an infant, was brought hither for his health; and, it is ſaid, the bedſtead he lay on, which is curiouſly wrought, is ſtill preſerved in the manor-houſe juſt by.

FLAMSTEED (John), an eminent Engliſh aſtronomer in the 13th century, born at Derby in 1646. He had early read a great deal of civil and eccleſiaſtical hiſtory; but happening to ſee John de Sacroboſco's book *de Sphæra*, this gave him a turn for aſtronomy, which ſtudy he afterwards proſecuted with great vigour. His father, finding him in correſpondence with ſeveral learned men, adviſed him to go to London, that he might be perſonally acquainted with them. In 1674, he wrote an ephemeris, in which he ſhowed the falſity of aſtrology; and gave a table of the moon's riſing and ſetting, carefully calculated, together with the eclipſes and appulſes of the moon and planets to fixed ſtars. This fell into the hands of Sir Jonas More; for whom, at his requeſt, he made a table of the moon's true ſouthings. In 1674, Sir Jonas having informed him, that a true account of the tides would be highly acceptable to his majeſty, he compoſed a ſmall ephemeris for the king's uſe: and when Sir Jonas ſhowed the king and duke of York our author's teleſcopes and micrometer, and recommended him ſtrongly, he procured him a warrant to be king's aſtronomer, with the ſalary of L. 100 *per annum*; on which occaſion he was ordained. In 1675, the foundation of the royal obſervatory at Greenwich was laid, and during the building he lodged at Greenwich; his quadrant and teleſcopes being kept in the queen's houſe there. His *Doctrine of the Sphere* was publiſhed in 1681, in a poſthumous work of Sir Jonas More, intitled, *A new Syſtem of the Mathematics*. In 1684, he was preſented to the living of Burſtow in Surry, which he enjoyed till he died in 1719. His *Hiſtoria cæleſtis Britannica* was publiſhed at London in 1725, in 3 vols. Mr Flamſteed likewiſe compoſed the Britiſh Catalogue of the

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Flanders, Flanel.

the fixed ſtars, which contains twice the number that are in the catalogue of Hevelius; to each of which he annexed its longitude, latitude, right aſcenſion, and diſtance from the pole, together with the variation of right aſcenſion and declination, while the longitude increaſes a degree. This catalogue, together with moſt of his obſervations, were printed on a fine paper and character, at the expence of the late prince George of Denmark.

FLANDERS, a province of the Netherlands, bounded by the German ſea and the United Provinces on the north, by the province of Brabant on the eaſt, by Hainault and Artois on the ſouth, and by another part of Artois and the German ſea on the weſt; being about 60 miles long, and 50 broad, and divided between the Auſtrians, the French, and the Dutch.

Flanders is a perfectly champaign country, with not a riſing ground or hill in it, and watered with many fine rivers and canals. Its chief commodities are fine lace, linen, and tapeſtry.

In this country ſome important arts were invented and improved. Weaving in general was greatly improved, and that of figures of all ſorts in linen were invented; alſo the art of dyeing cloths and ſtuffs, and of oil-colours; the curing of herrings, &c. The manufactures of this country are not now in the flouriſhing ſtate they were formerly; yet ſilk, cotton, and woollen ſtuffs, brocades, camblets, tapeſtry, lace, and linen, are ſtill manufactured here in great quantities. This province had counts of its own from the ninth century to the year 1369, when it went by marriage to the dukes of Burgundy; and afterwards from them, by marriage alſo, to the houſe of Auſtria. France, in 1667, ſeized the ſouthern part; and the States-General obtained the northern, partly by the treaty of Munſter, and partly by the barrier-treaty of 1715.

For a more particular hiſtory of Flanders, with a continuation down to the preſent times, ſee the article NETHERLANDS.

FLANEL, or FLANNEL, a kind of ſlight, looſe, woollen ſtuff, compoſed of a woof and warp, and wove on a loom with two treddles, after the manner of bays.

Dr Black aſſigns as a reaſon why flanel and other ſubſtances of the kind keep our bodies warm, that they compoſe a rare and ſpongy maſs, the fibres of which touch each other ſo ſlightly, that the heat moves ſlowly thro' the interſtices, which being filled only with air, and that in a ſtagnant ſtate, give little aſſiſtance in conducting the heat. Sir Benjamin Thomſon has inquired farther into the matter, and finds that there is a relation betwixt the power which the ſubſtances uſually worn as clothing have of abſorbing moiſture, and that of keeping our bodies warm. Having provided a quantity of each of theſe ſubſtances mentioned below, he expoſed them, ſpread out upon clean China plates, for the ſpace of 24 hours to the warm and dry air of a room which had been heated by a German ſtove for ſeveral months, and during the laſt ſix hours had raiſed the thermometer to 85° of Fahrenheit; after which he weighed equal quantities of the different ſubſtances with a very accurate balance. They were then ſpread out upon a China plate, and removed into a very large uninhabited room upon the ſecond floor, where they were expoſed 48 hours upon a table placed in the middle of the room, the air of which was at 45° of Fahrenheit. At the end of this ſpace they were weighed, and then removed into a damp cellar, and placed on a table in the middle of the vault, where the air was at the temperature of 45°, and which by the hygrometer ſeemed to be fully ſaturated with moiſture. In this ſituation they were ſuffered to remain three days and three nights; the vault being all the time hung round with wet linen cloths, to render the air as completely damp as poſſible. At the end of three days they were weighed, and the weights at the different times were found as in the following table.

Flanel.

	Weight after being dried in the hot room.	Weight after coming out of the cold room.	Weight after remaining 72 h. in the vault.
Sheeps wool	Parts 1000	1084	1163
Beaver's fur		1072	1125
The fur of a Ruſſian hare		1065	1115
Eeder down		1067	1112
Silk: Raw ſingle thread		1057	1107
Silk: Ravellings of white taffety		1054	1103
Linen: Fine lint		1046	1102
Linen: Ravellings of fine linen		1044	1082
Cotton wool		1043	1089
Ravellings of ſilver lace		1000	1000

On theſe experiments our author obſerves, that though linen, from the apparent eaſe with which it receives dampneſs from the atmoſphere, ſeems to have a much greater attraction for water than any other; yet it would appear from what is related above, that thoſe bodies which receive water in its unelaſtic form with the greateſt eaſe, or are moſt eaſily wet, are not thoſe which in all caſes attract the moiſture of the atmoſphere with the greateſt avidity. "Perhaps (ſays he), the apparent dampneſs of linen to the touch, ariſes more from the eaſe with which that ſubſtance parts with the water it contains, than from the quantity of water it actually holds: in the ſame manner as a body appears hot to the touch, in conſequence of its parting freely with its heat; while another body, which is really at the ſame temperature, but which with-holds its heat with greater obſtinacy, affects the ſenſe of feeling much leſs violently. It is well known that woollen clothes, ſuch as flanels, &c. worn next the ſkin, greatly promote inſenſible perſpiration. May not this ariſe principally from the ſtrong attraction which ſubſiſts between wool and the watery vapour which is continually iſſuing from the human body? That it does not depend entirely on the warmth of that covering, is clear; for the ſame degree of warmth produced by wearing more clothing of a different kind, does not produce the ſame effect. The perſpiration of the human body being abſorbed by a covering of flanel, it is immediately diſtributed through the whole thickneſs of that ſubſtance, and by that means expoſed, by a very large ſurface, to be carried off by the atmoſphere; and the loſs of this watery vapour, which the flanel ſuſtains on the one ſide by evaporation, being immediately reſtored from the other, in conſequence of the ſtrong attraction between the flanel and this vapour, the pores of the ſkin are diſincumbered, and they are continually ſurrounded by a dry and ſalubrious atmoſphere."

Our author expreſſes his ſurpriſe, that the cuſtom of wearing

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Flank || Flatman.

wearing flanel next the ſkin ſhould not have prevailed more univerſally. He is confident it would prevent a number of diſeaſes; and he thinks there is no greater luxury than the comfortable ſenſation which ariſes from wearing it, eſpecially after one is a little accuſtomed to it. "It is a miſtaken notion (ſays he), that it is too warm a clothing for ſummer. I have worn it in the hotteſt climates, and at all ſeaſons of the year; and never found the leaſt inconvenience from it. It is the warm bath of a perſpiration confined by a linen ſhirt, wet with ſweat, which renders the ſummer heats of ſouthern climates ſo inſupportable; but flanel promotes perſpiration, and favours its evaporation; and evaporation, as is well known, produces poſitive cold.

It has been obſerved that new flanel, after ſome time wearing, acquires the property of ſhining in the dark, but loſes it on being waſhed. *Philoſ. Tranſ.* n° 483. § 7.

FLANK, or FLANC, in the manege, is applied to the ſides of a horſe's buttocks, &c. In a ſtrict ſenſe, the flanks of a horſe are the extremes of the belly, where the ribs are wanting, and are below the loins.

The flanks of a horſe ſhould be full, and at the top of each a feather. The diſtance between the laſt rib and haunch-bone, which is properly the flank, ſhould be ſhort, which they term *well coupled*, ſuch horſes being moſt hardy, and fit to endure labour.

A horſe is ſaid to have no flank if the laſt of the ſhort ribs be at a conſiderable diſtance from the haunch-bone; as alſo when his ribs are too much ſtraightened in their compaſs.

FLANK, in war, is uſed by way of analogy for the ſide of a battalion, army, &c. in contradiſtinction to the *front* and *rear*.

To attack the enemy in flank, is to diſcover and fire upon them on one ſide. See FILE.

FLANK, in fortification, is a line drawn from the extremity of the face towards the inſide of the work.

Or, flank is that part of a baſtion which reaches from the curtain to the face, and defends the oppoſite face, the flank, and the curtain. See FORTIFICATION.

FLAT, in ſea-language, denotes a level ground lying at a ſmall depth under the ſurface of the ſea, and is alſo called a *ſhoal* or *ſhallow*.

FLAT-bottomed Boats are ſuch as are made to ſwim in ſhallow water, and to carry a great number of troops, artillery, ammunition, &c. They are conſtructed with a 12 pounder, bow-chaſe, and an 18 pounder, ſtern-chaſe; their keel is from 90 to 100 feet, and from 12 to 24 feet beam: they have one maſt, a large ſquare main ſail, and a jib-ſail; are rowed by 18 or 20 oars, and can carry 400 men each. The gun takes up one bow, and a bridge the other, over which the troops are to march. Thoſe that carry horſes have the fore-part of the boat made to open when the men are to mount and ride over a bridge.

FLATMAN (Thomas), an Engliſh poet of ſome repute, born at London about the year 1633. He ſtudied at the Inner-Temple, and became a barriſter, but it does not appear that he ever practiſed; for having a turn for the fine arts, he gave a looſe to his inclination that way, and acquired reputation, both as a poet and a painter. He publiſhed, in 1682, a third edition of his poems and ſongs, dedicated to the duke of Ormond, with a print of himſelf as a frontiſpiece; he alſo publiſhed a ſatirical romance in proſe, on Richard Cromwell, ſoon after the reſtoration; which took greatly at that turn of affairs. He died about 1688.

Flats || Flax.

FLATS, in muſic. See INTERVAL.

FLATUS, FLATULENCE, in medicine; vapours generated in the ſtomach and inteſtines, chiefly occaſioned by a weakneſs of theſe parts. They occaſion diſtenſions, uneaſy ſenſation, and ſickneſs, and often a conſiderable degree of pain. See (the *Index* ſubjoined to) MEDICINE.

FLAVEL (John), an eminent nonconformiſt miniſter, was educated at Univerſity-college, in Oxford; and became miniſter of Deptford, and afterwards of Dartmouth in Devonſhire, where he reſided the greateſt part of his life, and was admired for his preaching. Though he was generally reſpected at Dartmouth; yet, in 1685, ſeveral of the aldermen of that town, attended by the rabble, carried about a ridiculous effigy of him, to which were affixed the Bill of Excluſion and the Covenant. Upon this occaſion, he thought it prudent to withdraw from the town; not knowing what treatment he might meet with from a riotous mob, headed by magiſtrates who were themſelves among the loweſt of mankind. Part of his Diary, printed with his Remains, muſt give the reader a high idea of his piety. He died in 1691, aged 61; and after his death, his works, which conſiſted of many pieces of practical divinity, were printed in two volumes folio. Among theſe, the moſt famous are his "Navigation Spiritualized, or a New Compaſs for Seamen, conſiſting of 32 points of pleaſant obſervations and ſerious reflections," of which there have been ſeveral editions in 8vo; and his "Huſbandry Spiritualized, &c. with occaſional meditations upon beaſts, birds, trees, flowers, rivers, and ſeveral other objects," of which alſo there have been many editions in octavo.

FLAX, in botany. See LINUM.

The following particulars with regard to the manner of raiſing flax, has been for ſome years paſt warmly recommended by the truſtees for fiſheries, manufactures, and improvements in Scotland.

Of the choice of the Soil, and preparing the Ground for FLAX. A ſkilful flax-raiſer always prefers a free open deep loam, and all grounds that produced the preceding year a good crop of turnip, cabbage, potatoes, barley, or broad clover; or have been formerly laid down rich, and kept for ſome years in paſture.

A clay ſoil, the ſecond or third crop after being limed, will anſwer well for flax; provided, if the ground be ſtill ſtiff, that it be brought to a proper mould, by tilling after harveſt, to expoſe it to the winter froſts.

All new grounds produce a ſtrong crop of flax, and pretty free of weeds. When a great many mole-heaps appear upon new ground, it anſwers the better for flax after one tilling.

Flax-ſeed ought never to be ſown on grounds that are either too wet or dry; but on ſuch as retain a natural moiſture: and ſuch grounds as are inclined to weeds ought to be avoided, unleſs prepared by a careful ſummer-fallow.

If the lint-ſeed be ſown early, and the flax not allowed to ſtand for ſeed, a crop of turnip may be got after the flax that very year; the ſecond year a crop

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Flax. of bear or barley may be taken; and the third year, graſs-ſeeds are ſometimes ſown along with the lintſeed. This is the method moſtly practiſed in and about the counties of Lincoln and Somerſet, where great quantities of flax and hemp are every year raiſed, and where theſe crops have long been capital articles. There, old ploughed grounds are never ſown with lintſeed, unleſs the ſoil be very rich and clean. A certain worm, called in Scotland the *coup-worm*, abounds in new-broke up grounds, which greatly hurts every crop but flax. In ſmall incloſures ſurrounded with trees or high hedges, the flax, for want of free air, is ſubject to fall before it be ripe, and the droppings of rain and dew from the trees prevent the flax within the reach of the trees from growing to any perfection.

Of preceding crops, potatoes and hemp are the beſt preparation for flax. In the fens of Lincoln, upon proper ground of old tillage, they ſow hemp, dunging well the firſt year; the ſecond year hemp without dung; the third year, flax without dung; and that ſame year, a crop of turnip eat on the ground by ſheep; the fourth year, hemp with a large coat of dung; and ſo on for ever.

If the ground be free and open, it ſhould be but once ploughed; and that as ſhallow as poſſible, not deeper than 2½ inches. It ſhould be laid flat, reduced to a fine garden mould by much harrowing, and all ſtones and ſods ſhould be carried off.

Except a little pigeon's dung for cold or ſour ground, no other dung ſhould be uſed preparatory for flax; becauſe it produces too many weeds, and throws up the flax thin and poor upon the ſtalk.

Before ſowing, the bulky clods ſhould be broken, or carried off the ground; and ſtones, quickenings, and every other thing that may hinder the growth of the flax, ſhould be removed.

Of the choice of Lintſeed. The brighter in colour, and heavier the ſeed is, ſo much the better; that which when bruiſed appears of a light or yelloviſh green, and freſh in the heart, oily and not dry, and ſmells and taſtes ſweet, and not fuſty, may be depended upon.

Dutch ſeed of the preceding year's growth, for the moſt part, anſwers beſt; but it ſeldom ſucceeds if kept another year. It ripens ſooner than any other foreign ſeed. Philadelphia-ſeed produces fine lint and few bolls, becauſe ſown thick, and anſwers beſt in wet cold ſoils. Riga-ſeed produces coarſer lint, and the greateſt quantity of ſeed. Scots-ſeed, when well winned and kept, and changed from one kind of ſoil to another, ſometimes anſwers pretty well; but ſhould be ſown thick, as many of its grains are bad, and fail. It ſprings well, and its flax is ſooner ripe than any other; but its produce afterwards is generally inferior to that from foreign ſeed.

A kind has been lately imported, called *memmel-ſeed*; which looks well, is ſhort and plump, but ſeldom grows above eight inches, and on that account ought not to be ſown.

Of Sowing Lintſeed. The quantity of lintſeed ſown ſhould be proportioned to the condition of the ſoil; for if the ground be in good heart, and the ſeed ſown thick, the crop will be in danger of falling before it is ready for pulling. From 11 to 12 pecks Linlithgow meaſure of Dutch or Riga ſeed, is generally ſufficient for one Scots acre; and about 10 pecks of Philadelphia ſeed, which, being the ſmalleſt grained, goes fartheſt. Riga lintſeed, and the next year's produce of it, is preferred in Lincolnſhire. Flax.

The time for ſowing lintſeed is from the middle of March to the end of April, as the ground and ſeaſon anſwers; but the earlier the ſeed is ſown, the leſs the crop interferes with the corn-harveſt.

Late ſown lintſeed may grow long, but the flax upon the ſtalk will be thin and poor.

After ſowing, the ground ought to be harrowed till the ſeed is well covered, and then (ſuppoſing the ſoil, as before mentioned, to be free and reduced to a fine mould) it ought to be rolled.

When a farmer ſows a large quantity of lintſeed, he may find it proper to ſow a part earlier and part later, that in the future operations of weeding, pulling, watering, and graſſing, the work may be the eaſier and more conveniently gone about.

It ought always to be ſown on a dry bed.

Of Weeding Flax. It ought to be weeded when the crop is about four inches long. If longer deferred, the weeders will ſo much break and crook the ſtalks, that they will never perhaps recover their ſtraightneſs again; and when the flax grows crooked, it is more liable to be hurt in the rippling and ſwingling.

Quicken-graſs ſhould not be taken up; for, being ſtrongly rooted, the pulling of it always looſens a deal of the lint.

If there is an appearance of a ſettled drought, it is better to defer the weeding, than by that operation to expoſe the tender roots of the flax to the drought.

How ſoon the weeds are got out, they ought to be carried off the field, inſtead of being laid in the furrows, where they often take root again, and at any rate obſtruct the growth of the flax in the furrows.

Of Pulling Flax. When the crop grows ſo ſhort and branchy, as to appear more valuable for ſeed than flax, it ought not to be pulled before it be thoroughly ripe; but if it grows long and not branchy, the ſeed ſhould be diſregarded, and all the attention given to the flax. In the laſt caſe it ought to be pulled after the bloom has fallen, when the ſtalk begins to turn yellow, and before the leaves fall, and the bolls turn hard and ſharp-pointed.

When the ſtalk is ſmall, and carries few bolls, the flax is fine; but the ſtalk of coarſe flax is groſs, rank, branchy, and carries many bolls.

When the flax has fallen, and lies; ſuch as lies ought to be immediately pulled, whether it has grown enough or not, as otherwiſe it will rot altogether.

When parts of the ſame field grow unequally, ſo that ſome parts are ready for pulling before other parts; only what is ready ſhould be pulled, and the reſt ſhould be ſuffered to ſtand till ready.

The flax-raiſer ought to be at pains to pull, and keep by itſelf, each different kind of lint which he finds in his field; what is both long and fine, by itſelf; what is both long and coarſe, by itſelf; what is both ſhort and fine, by itſelf; what is both ſhort and coarſe, by itſelf; and in like manner every other kind by itſelf that is of the ſame ſize and quality. If the different kinds be not thus kept ſeparate, the flax muſt be much damaged in the watering and the other ſucceeding operations.

What

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Flax. What is commonly called *under growth* may be neglected as uſeleſs.

Few perſons that have ſeen pulled flax, are ignorant of the method of laying it in handfuls acroſs each other; which gives the flax ſufficient air, and keeps the handfuls ſeparate and ready for the rippler.

Of Stacking up FLAX *during the Winter, and Winning the Seed.* If the flax be more valuable than the ſeed, it ought by no means to be ſtacked up; for its own natural juice aſſiſts it greatly in the watering; whereas, if kept long unwatered, it loſes that juice, and the harle adheres ſo much to the boon, that it requires longer time to water, and even the quality of the flax becomes thereby harſher and coarſer. Beſides, the flax ſtacked up over year, is in great danger from vermin and other accidents; the water in ſpring is not ſo ſoft and warm as in harveſt; and near a year is thereby loſt of the uſe of the lint: but if the flax be ſo ſhort and branchy as to appear moſt valuable for ſeed, it ought, after pulling, to be ſtooked and dried upon the field, as is done with corn; then ſtacked up for winter, rippled in ſpring; and after ſheeling, the ſeed ſhould be well cleaned from bad ſeeds, &c.

Of Rippling FLAX. After pulling, if the flax is to be regarded more than the ſeed, it ſhould be allowed to lie ſome hours upon the ground to dry a little, and ſo gain ſome firmneſs, to prevent the ſkin or harle, which is the flax, from rubbing off in the rippling; an operation which ought by no means to be neglected, as the bolls, if put into the water along with the flax, breed vermin there, and otherwiſe ſpoil the water. The bolls alſo prove very inconvenient in the graſſing and breaking.

In Lincolnſhire and Ireland, they think that rippling hurts the flax; and therefore, in place of rippling, they ſtrike the bolls againſt a ſtone.

The handfuls for rippling ſhould not be great, as that endangers the lint in the rippling comb.

After rippling, the flax-raiſer will perceive, that he is able to aſſort each ſize and quality of the flax by itſelf more exactly than he could before.

Of Watering FLAX. A running ſtream waſtes the lint, makes it white, and frequently carries it away. Lochs, by the great quantity and motion of the water, alſo waſte and whiten the flax, though not ſo much as running ſtreams. Both rivers and lochs water the flax quicker than canals.

But all flax ought to be watered in canals, which ſhould be digged in clay ground if poſſible, as that ſoil retains the water beſt: but if a firm retentive ſoil cannot be got, the bottom or ſides of the canal, or both the bottom and ſides, may be lined with clay; or inſtead of lining the ſides with clay, which might fall down, a ditch may be dug without the canal, and filled with clay, which will prevent both extraneous water from entering, and the water within from running off.

A canal of 40 feet long, ſix broad, and four deep, will generally water the growth of an acre of flax.

It ought to be filled with freſh ſoft water from a river or brook, if poſſible two or three weeks before the flax is put in, and expoſed all that time to the heat of the ſun. The greater way the river or brook has run, the ſofter, and therefore the better, will the water be. Springs, or ſhort-runs from hills, are too cold, unleſs the water is allowed to ſtand long in the canal. Water from coal or iron is very bad for flax. A little of the powder of galls thrown into a glaſs of water, will immediately diſcover if it comes from minerals of that kind, by turning it into a dark colour, more or leſs tinged in proportion to the quantity of vitriol it contains. Flax.

The canal ought not to be under ſhade; which, beſides keeping the ſun from ſoftening the water, might make part of the canal cooler than other parts, and ſo water the flax unequally.

The flax-raiſer will obſerve, when the water is brought to a proper heat, that ſmall plants will be riſing quickly in it, numbers of ſmall inſects and reptiles will be generating there, and bubbles of air riſing on the ſurface. If no ſuch ſigns appear, the water muſt not be warm enough, or is otherwiſe unfit for flax.

Moſs-holes, when neither too deep nor too ſhallow, frequently anſwer well for watering flax, when the water is proper, as before deſcribed.

The proper ſeaſon for watering flax is from the end of July to the end of Auguſt.

The advantage of watering flax as ſoon as poſſible after pulling, has been already mentioned.

The flax being ſorted after rippling, as before-mentioned, ſhould next be put in beets, never larger than a man can graſp with both his hands, and tied very ſlack with a band of a few ſtalks. Dried ruſhes anſwer exceedingly well for binding flax, as they do not rot in the water, and may be dried and kept for uſe again.

The beets ſhould be put into the canals ſlope-ways, or half ſtanding upon end, the root-end uppermoſt. Upon the crop-ends, when uppermoſt, there frequently breeds a deal of vermin, deſtructive of the flax, which is effectually prevented by putting the crop-end downmoſt.

The whole flax in the canal ought to be carefully covered from the ſun with divots; the graſſy ſide of which ſhould be next the flax, to keep it clean. If it is not thus covered, the ſun will diſcolour the flax, though quite covered with water. If the divots are not weighty enough to keep the flax entirely under water, a few ſtones may be laid above them. But the flax ſhould not be preſſed to the bottom.

When the flax is ſufficiently watered, it feels ſoft to the gripe, and the *harle* parts eaſily with the *boon* or *ſhow*, which laſt is then become brittle, and looks whitiſh. When theſe ſigns are found, the flax ſhould be taken out of the water, beet after beet; each gently rinſed in the water, to cleanſe it of the naſtineſs which has gathered about it in the canal; and as the lint is then very tender, and the beet ſlackly tied, it muſt be carefully and gently handled.

Great care ought to be taken that no part be overdone; and as the coarſeſt waters ſooneſt, if different kinds be mixed together, a part will be rotted, when the reſt is not ſufficiently watered.

When lint taken out of the canal is not found ſufficiently watered, it may be laid in a heap for 12, 18, or 24 hours, which will have an effect like more watering; but this operation is nice, and may prove dangerous in unſkilful hands.

After the flax is taken out of the canal, freſh lint ſhould

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Flax. should not be put a second time into it, until the former water be run off, and the canal cleaned, and supplied with fresh water.

Of Grassing FLAX. Short heath is the best field for grassing flax; as, when wet, it fastens to the heath, and is thereby prevented from being blown away by the wind. The heath also keeps it a little above the earth, and so exposes it the more equally to the weather. When such heath is not to be got, links or clean old lea-ground is the next best. Long-grass grounds should be avoided, as the grass growing thro' the lint frequently spots, tenders, or rots it; and grounds exposed to violent winds should also be avoided.

The flax, when taken out of the water, must be spread very thin upon the ground; and being then very tender, it must be gently handled. The thinner it is spread the better, as it is then the more equally exposed to the weather. But it ought never to be spread during a heavy shower, as that would wash and waste the harle too much, which is then excessively tender, but soon after becomes firm enough to bear the rains, which, with the open air and sunshine, cleans, softens, and purifies the harle to the degree wanted, and makes it blister from the boon. In short, after the flax has got a little firmness by being a few hours spread in dry weather, the more rain and sunshine it gets the better.

If there be little danger of high winds carrying off the flax, it will be much the better of being turned about once a-week. If it is not to be turned, it ought to be very thin spread. The spreading of flax and hemp requires a deal of ground, and enriches it greatly.

The skilful flax-raiser spreads his first row of flax at the end of the field opposite to the point from whence the most violent wind commonly comes, placing the root-ends foremost; he makes the root-ends of every other row over-lap the crop-ends of the former row three or four inches, and binds down the last row with a rope; by which means the wind does not easily get below the lint to blow it away: and as the crop-ends are seldom so fully watered as the root-ends, the aforesaid overlapping has an effect like giving the crop-ends more watering. Experience only can fully teach a person the signs of flax being sufficiently grassed: then it is of a clearer colour than formerly; the harle is blistered up, and easily parts with the boon, which is then become very brittle. The whole should be sufficiently grassed before any of it is lifted; for if a part be lifted sooner than the rest, that which remains is in great danger from the winds. Flax.

A dry day ought to be chosen for taking up the flax; and if there is no appearance of high wind, it should be loosed from the heath or grass, and left loose for some hours, to make it thoroughly dry.

As a great quantity of flax can scarcely be all equally watered and grassed, and as the different qualities will best appear at lifting the flax off the grass; therefore at that time each different kind should be gathered together, and kept by itself; that is, all of the same colour, length, and quality.

The smaller the beets lint is made up in, the better for drying, and the more convenient for stacking, housing, &c. and in making up these beets, as in every other operation upon flax, it is of great consequence that the lint be laid together as it grew, the root-ends together, and the crop-ends together.

Follows an estimate of the Expence, Produce, and Profit of a Scots Acre of FLAX,—*supposing the season favourable, that no accidental losses happen, and that the farmer is neither unskilful nor negligent.*

	A medium crop.	*A great crop.*	*An extra. crop.*
Ground-rent, labouring the ground, and leading the flax	L. 2 10 0	L. 3 10 0	L. 5 0 0
Lintseed from L. 2. to L. 4. *per* hogshead, the medium 3 s. 4 d. *per* peck — — —	1 16 8 for 11 pecks.	1 10 0 for 9 pecks.	1 6 8 for 8 pecks.
Clodding and sowing — — —	0 2 0	0 2 0	0 2 0
Weeding — — — —	0 12 0	0 8 0	nothing.
Pulling, rippling, putting in, and covering in the water — — —	0 14 0	0 15 0	1 0 0
Taking out of the water, grassing, and stacking	0 8 0	0 12 0	0 18 0
Breaking and scutching, at 2 s. *per* stone —	3 0 0 for 30 stones.	4 0 0 for 40 stones.	6 0 0 for 60 stones.
Total expence	L. 9 2 8	L. 10 17 0	L. 14 6 8
Produce at 10 s. *per* stone — —	L. 15 0 0 for 30 stones.	L. 20 0 0 for 40 stones.	L. 30 0 0 for 60 stones.
Lintseed sold for oil at 1 s. *per* peck — —	0 16 0	0 18 0	1 0 0
The chaff of the bolls is well worth the expence of drying the seed; as it is good food, when boiled and mixed with beer, for horses.			
Total produce	L. 15 16 0	L. 20 18 0	L. 31 0 0
Balance for profit — — —	L. 6 14 4	L. 10 1 0	L. 16 13 4

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Flax

There is nothing ſtated here as expence of the canal in which the flax is watered; becauſe that varies much according to the conveniences people have for making it; and a canal once made requires for after years only to be repaired and cleanſed.

It is a certain fact, that the greater the crop is, the better is the quality of the ſame kind of flax.

The advantage of having both a crop of flax and a crop of turnip the ſame year—or of ſowing graſs-ſeeds along with the lintſeed—and of reducing the ground to a fine garden mould, free of weeds, ought to be attended to.

For Cambric and fine Lawn. The ground muſt be a rich light ſoil, rather ſandy, but cannot be too rich.

It ought to be ploughed in September, or the beginning of October, firſt putting a little hot rotten dung upon it. In January it ought to have a ſecond ploughing, after a hard froſt; and when you intend to ſow it, plough it a third time, or rather hoe it, reducing the clods very fine; but make no furrows: the land muſt be made level like a garden; but never work the land when wet.

The ſeed ſhould be ſown the beginning of April, and about double the quantity that is generally ſown by our farmers; if the land be very rich, it will require rather more than double.

As ſoon as ſown (if the weather be dry) it will be neceſſary to roll the ground.

The lint muſt be weeded very clean when about three inches high; directly after which you muſt ſet forked ſticks, of about one-and-half inch thick (which ought to be prepared before), every four or five feet, according to the length of the poles you are to lay upon them; they ſhould be well fixed in the ground, the forked part to receive the poles about ſix or ſeven inches above the lint; each row of poles ſhould be two, three, or four feet aſunder, according to the length of the bruſhwood you are to lay upon them.

The poles ought to be from 10 to 15 feet long, and ſtrong enough to ſupport the bruſh acroſs the poles; take the longeſt bruſhwood you can get, the more branchy the better, very thick, filling up the vacancies with ſmaller bruſh, and any of the branches that riſe higher than 18 or 20 inches ought to be lopt off to make the bruſh lie as level as poſſible: any ſort of bruſh will do except oak, as that tinges the lint.

Your lint muſt be pulled as ſoon as the ſeed is fully formed, which is a few days after it is out of the bloom, before the lint turn yellow.

It muſt be pulled above the bruſhwood, and every handful laid upon it as ſoon as poſſible: if it is fine weather, leave it four or five hours in that manner; then carry it to a ſcreen near a barn, to put it under cover in caſe of rain; there it muſt be ſpread four or five days, and always put in the barn at night, or when it appears to rain: the bundles muſt be opened in the barn, or made hollow, to prevent it from heating.

Theſe operations muſt be performed until the lint is perfectly dry, and out of danger of heating; taking care all the time to keep the roots as even as poſſible, and if poſſible keep it from rain or wet: if you cannot prevent it from being wet, it will be better to leave it on the graſs till dry; becauſe when once wet, the putting it under cover before dry will make it turn black; a thing which muſt be prevented at all events.

Flax

If any of the lint upon the border, or through the piece of ground, be coarſer than another, it muſt be ſeparated from the reſt.

The utmoſt care muſt be taken to preſerve the lint entire or unbroken; for this reaſon they beat off the ſeed with a round mell or bittle.

The moſt proper ground is ſummer fallow, or after potatoes or lea; if poſſible near a wood, to prevent the expence of carrying bruſh.

As ſoon as the ſeed is off, if you intend to water it that ſeaſon, it muſt be tied in bundles about as large as you can graſp with your two hands.

The water proper for it, is a very ſmall rivulet or ſoft ſpring free of any metallic ore; taking care that no flood or foul water enters your pit; which muſt be at leaſt five feet deep, about nine or ten broad at the top, and ſeven or eight at the bottom; the length will depend on the quantity of flax you have to water. A very ſmall ſtripe of water, when clear, ſhould always be running in and off from your pit when the lint is in it.

The pit ought to be made three or four months before it be uſed.

You muſt drive poles about four inches thick, with a hook inclining downwards, in this form 7, all along the ſides of the pit, above five feet aſunder. The hooks muſt be level with, or rather under, the ſurface of the water. A long pole, the whole length of the pit, muſt be fixed into theſe hooks on each ſide; and croſs poles put under that, to keep the lint under water; but the croſs poles are not uſed till the lint is put in. You muſt order it ſo, that all the lint ſhould be three or four inches under water. You next bring your lint to the ſides of the pit; then put your ſheaves head to head, cauſing each to overlap the other about one third, and take as many of theſe as make a bundle of two or two and a half feet broad, laying the one above the other till it is about four or four and a half feet high; then you tie them together in the middle, and at each root-end: after this, you wrap your bundle in ſtraw, and lay it in the water, putting the thin or broad ſide undermoſt, taking care that none of your lint touch the earth; after it is fully preſſed under water, put in your croſs poles to keep it under. The bundles ought to lie in the pit a foot ſeparate from each other. This renders it eaſy to take out; for, if the bundles entangle, they will be too heavy to raiſe.

The time of watering depends ſo much upon the weather, and ſoftneſs or hardneſs of the water, that it is impoſſible to fix any certain time. This muſt be left to the ſkill of the farmer. If the flax be intended for ſpinning yarn ſoft and fit for cambric, it ought to be ſpread upon ſhort graſs for four or five days before you put it into the water; but if for lawns, lace, or thread, it is beſt to dry it outright. In either caſe, avoid as much as poſſible to let it get rain; as much rain blanches and waſhes out the oil, which is neceſſary to preſerve the ſtrength.

The great property of this flax is to be fine and long. Thick ſowing raiſes all plants fine and ſlender; and when the ground is very rich, it forces them to a great length. Pulling green prevents that coarſe hardneſs which flax has when let ſtand till it be full ripe, and gives it the fine ſilky property. The bruſhwood, when the flax ſprings up, catches it by the middle,

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Flax. dle, prevents it from lying down and rotting; infallible conſequences of ſowing thick upon rich ground. It likewiſe keeps it ſtraight, moiſt, and ſoft at the roots; and by keeping it warm, and ſhaded from the ſun, greatly promotes its length. The keeping it from rain, heating, taking proper care of your water, preſerves the colour, and prevents thoſe bars in cloth ſo much complained of by bleachers. Flax.

Flax-Dreſſing. For many ages it was the practice to ſeparate the boon or core from the flax, which is the bark of the plant, by the following ſimple *hand methods*. Firſt, for breaking the boon, the ſtalks in ſmall parcels were beat with a mallet; or, more dexterouſly, the *break* (Plate CXCIV. fig. 1. and 2.) was uſed thus: The flax being held in the left-hand acroſs the three *under-teeth* or *ſwords* of the break (*A*, fig. 1. and *a*, fig. 2.), the *upper-teeth* (*B*, fig. 1. and *b*, fig. 2.) were with the right hand quickly and often forced down upon the flax, which was artfully ſhifted and turned with the left hand. Next, for clearing the flax of the broken boon: the workman with his left-hand held the flax over the *ſtock* (fig. 3. and 4.), while with his right-hand he ſtruck or threſhed the flax with the *ſcutcher* (fig. 5.)

Theſe methods of breaking and ſcutching the flax being ſlow and very laborious, a *water-mill* was invented in Scotland about 40 years ago; which, with ſome late improvements, makes great diſpatch, and in ſkilful and careful hands gives ſatisfaction. It has been generally conſtructed to break the boon by three dented rollers, placed one above the other. The middle one of which, being forced quickly round, takes the other two along with it, and one end of the handfuls of the flax being by the workmen directed in between the upper and middle rollers, the flax is immediately drawn in by the rollers; a curved board or plate of tin behind the rollers directs the flax to return again between the middle and undermoſt rollers;—and thus the operation is repeated until the boon be ſufficiently broke. Great weights of timber or ſtone at the ends of levers, preſs the upper and under rollers towards the middle one.

The ſcutching is next carried on by the mill in the following manner: Four arms, ſomething like the hand-ſcutchers before deſcribed, project from a perpendicular axle; a box around the axle incloſes theſe projecting ſcutchers; and this box is divided among the workmen, each having ſufficient room to ſtand and handle his flax, which, through ſlits in the upper part and ſides of the box, they hold in to the ſtroke of the ſcutchers; which, moving round horizontally, ſtrike the flax acroſs or at right angles, and ſo threſh out or clear it of the boon.

The breaking of the flax by *rollers* is ſcarcely ſubject to any objection, but that it is dangerous to workmen not ſufficiently on their guard, who ſometimes allow the rollers to take hold of their fingers, and thereby their whole arm is inſtantly drawn in: thus many have loſt their arms. To avoid this danger, a break, upon the general principles of the hand-break before deſcribed, has been lately adapted to water-machinery, and uſed in place of rollers. The horizontal ſtroke of the ſcutchers was long thought too ſevere, and waſteful of the flax; but very careful experiments have diſcovered that the waſte complained of muſt be charged to the unſkilfulneſs or negligence of the workmen, as in good hands the mill carries away nothing but what, if not ſo ſcutched off, muſt be taken off in the heckling with more loſs both of time and flax. But to obviate this objection of the violence of the *horizontal ſcutchers*, an imitation of hand-ſcutching has lately been applied to water. The ſcutchers then project from an horizontal axle, and move like the arms of a check-reel, ſtriking the flax neither acroſs nor perpendicularly down, but ſloping in upon the parcel exactly as the flax is ſtruck by the hand-ſcutcher. This ſloping ſtroke is got by raiſing the ſcutching-ſtock ſome inches higher than the centre of the axle; and by raiſing or lowering the ſtock, over which the flax is held, or ſcrewing it nearer to or farther from the ſcutchers, the workman can temper or humour the ſtroke almoſt as he pleaſes.

A lint-mill, with horizontal ſcutchers upon a perpendicular axle, requires a houſe of two ſtories, the rollers or break being placed in the ground ſtory, and the ſcutchers in the loft above; but a mill with vertical ſcutchers on an horizontal axle, requires but one ground ſtory for all the machinery.

Another method of breaking and ſcutching flax, more expeditious than the old hand-methods, and more gentle than water-mills, has alſo been lately invented in Scotland. It is much like the break and ſcutcher giving the ſloping ſtroke laſt deſcribed, moved by the foot. The treddle is remarkably long, and the ſcutchers are fixed upon the rim of a fly-wheel. The foot-break is alſo aſſiſted in its motion by a fly. Theſe foot-machines are very uſeful where there are no water-mills, but they are far inferior to the mills in point of expedition.

The next operation that flax undergoes after ſcutching is heckling. The *heckle* (fig. 6.) is firmly fixed to a bench before the workman, who ſtrikes the flax upon the teeth of the heckle, and draws it through the teeth. To perſons unacquainted with that kind of work this may ſeem a very ſimple operation; but, in fact, it requires as much practice to acquire the ſlight of heckling well, and without waſting the flax, as any other operation in the whole manufacture of linen. They uſe coarſer and wider teethed heckles, or finer, according to the quality of the flax; generally putting the flax through two heckles, a coarſer one firſt, and next a fine one.

Flax for cambric and fine lawn, thread, and lace, is dreſſed in a manner ſomewhat different. It is not ſkutched ſo thoroughly as common flax; which from the ſkutch proceeds to the heckle, and from that to the ſpinner: whereas, this fine flax, after a rough ſkutching, is ſcraped and cleanſed with a blunt knife upon the workman's knee covered with his leather-apron; from the knife it proceeds to the ſpinner, who, with a bruſh made for the purpoſe, ſtraights and dreſſes each parcel juſt before ſhe begins to ſpin it.

The following obſervations, firſt publiſhed in the Gentleman's Magazine for June 1787, ſeem worthy of very particular attention, and may not therefore be improperly ſubjoined as a ſupplement to the preſent article.

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Flax. *Of the watering of Flax by a new method, ſo as to ſhorten labour, to add probably to the ſtrength of the flax, and to give it a much finer colour, which would render the operation of bleaching ſafer and leſs tedious.* Flax.

"Though the following reflections have for their object an improvement in the very eſſential article of watering of flax, yet I muſt advertiſe the reader, that they are only theory, and muſt depend entirely for their truth and juſtification upon future experiments, ſkilfully and judiciouſly made. Should repeated trials prove the advantage of the new method propoſed, we may venture to affirm, that it would be an improvement that would increaſe the national income in the agricultural branch many thouſand pounds annually, would add greatly to the perfection of the linen manufacture, and over and above would ſuppreſs a very diſagreeable nuiſance, which the preſent method of watering flax occaſions during ſome part of the ſummer in every flax-growing country.

"The intention of watering flax is, in my opinion, to make the boon more brittle or friable, and, by ſoaking, to diſſolve that gluey kind of ſap that makes the bark of plants and trees adhere in a ſmall degree to the woody part. The bark of flax is called the *harle*; and when ſeparated from the uſeleſs woody part, the *boon*, this harle itſelf is called flax. To effect this ſeparation eaſily, the practice has long prevailed, of ſoaking the flax in water to a certain degree of fermentation, and afterwards drying it. For this ſoaking ſome prefer rivulets that have a ſmall current, and others ſtagnant water in ponds and lakes. In both methods the water acts as in all other caſes of infuſion and maceration; after two or three weeks it extracts a great many juices of a very ſtrong quality, which in ponds give the water an inky tinge and offenſive ſmell; and in rivulets mix in the ſtream and kill the fiſh. Nay, if this maceration be too long continued, the extracted and fermented ſap will completely kill the flax itſelf. For if, inſtead of two or three weeks, the new flax were to lie ſoaking in the water four or five months, I preſume it would be good for nothing but to be thrown upon the dunghill; both harle and boon would in time be completely rotted; yet the harle or flax, when entirely freed from this ſap, and manufactured into linen, or into ropes, might lie many months under water without being much damaged; as linen, it may be waſhed and ſteeped in ſcalding water twenty times without loſing much of its ſtrength; and as paper, it acquires a kind of incorruptibility.

"It appears then eſſential to the right management of new flax, to get rid of this pernicious vegetative ſap, and to macerate the boon; but from the complaints made againſt both the methods of watering now in uſe, there is reaſon to think that there is ſtill great room for improvement in that article. In rivulets, the vegetative ſap, as it is diſſolved, is carried off by the current, to the deſtruction of the fiſh. This prevents the flax from being ſtained; but the operation is tedious, and not complete, from the uncertainty of knowing when it is juſt enough, and not too much, or perhaps from neglect. In ponds, the inky tinge of the water often ſerves as a kind of dye to the flax, which imbibes it ſo ſtrongly, that double the labour in bleaching will hardly bring the linen made of ſuch flax to an equality in whiteneſs with linen made of flax untinged. This ſeems to be equally unwiſe as though we were to dye cotton black firſt, in order to whiten it afterwards. Theſe ponds, beſides, become a great nuiſance to the neighbourhood; the impregnated water is often of ſuch a pernicious quality, that cattle, however thirſty, will not drink of it; and the effluvia of it may perhaps be nearly as infectious as it is offenſive. If this effluvia is really attended with any contagious effects in our cold climate, a thing worth the enquiring into, how much more pernicious muſt its effects have been in the hot climate of Egypt, a country early noted for its great cultivation of flax?

"I have often thought that the proceſs of watering might be greatly improved and ſhortened by plunging the new flax, after it is rippled, into ſcalding water; which, in regard to extracting the vegetative ſap, would do in five minutes more than cold water would do in a fortnight, or perhaps more than cold water could do at all, in reſpect to the clearing the plant of ſap. Rough almonds, when thrown into ſcalding water, are blanched in an inſtant; but perhaps a fortnight's macerating thoſe almonds in cold water would not make them part ſo eaſily with their ſkins, which are the ſame to them as the harle is to the flax. Were tea leaves to be infuſed in cold water a fortnight, perhaps the tea produced by that infuſion would not be ſo good to the taſte, nor ſo ſtrongly tinged to the eye, as what is effected by ſcalding water in five minutes. By the ſame analogy, I think, flax or any ſmall twig would be made to part with its bark much eaſier and quicker by being dipped in boiling water than by being ſteeped in cold water.

"This reflection opens a door for a great variety of new experiments in regard to flax. I would therefore recommend to gentlemen cultivators and farmers, to make repeated trials upon this new ſyſtem, which would ſoon aſcertain whether it ought to be adopted in practice or rejected. One thing, I think, we may be certain of, that if the Egyptians watered their flax in our common manner, they undoubtedly watered it in *very warm water*, from the great heat of their climate, which would probably make them neglect to think of water heated by any other means than that of the ſun. A good general practice can only be eſtabliſhed upon repeated trials. Though one experiment may fail, another with a little variation may ſucceed; and the importance of the object deſired to be obtained will juſtify a good degree of perſeverance in the proſecution of the means. In this view, as the Chineſe thread is ſaid to be very ſtrong, it would be worth while to be acquainted with the practice of that diſtant nation, in regard to the rearing and manufacturing of flax, as well as with the methods uſed by the Flemings and the Dutch.

"Boiling water perhaps might at once clear the new flax from many impurities, which when not removed till it be ſpun into yarn, are then removed with difficulty, and with loſs of ſubſtance to the yarn. Why ſhould not the longitudinal fibres of the flax, before they be ſpun into yarn, be made not only as *fine* but as *clean* as poſſible? Upon the new ſyſtem propoſed, the act of bleaching would begin immediately after the rippling of the flax; and a little done then, might perhaps ſave much of what is generally done after the ſpinning and weaving. To ſpin dirty flax with a view of

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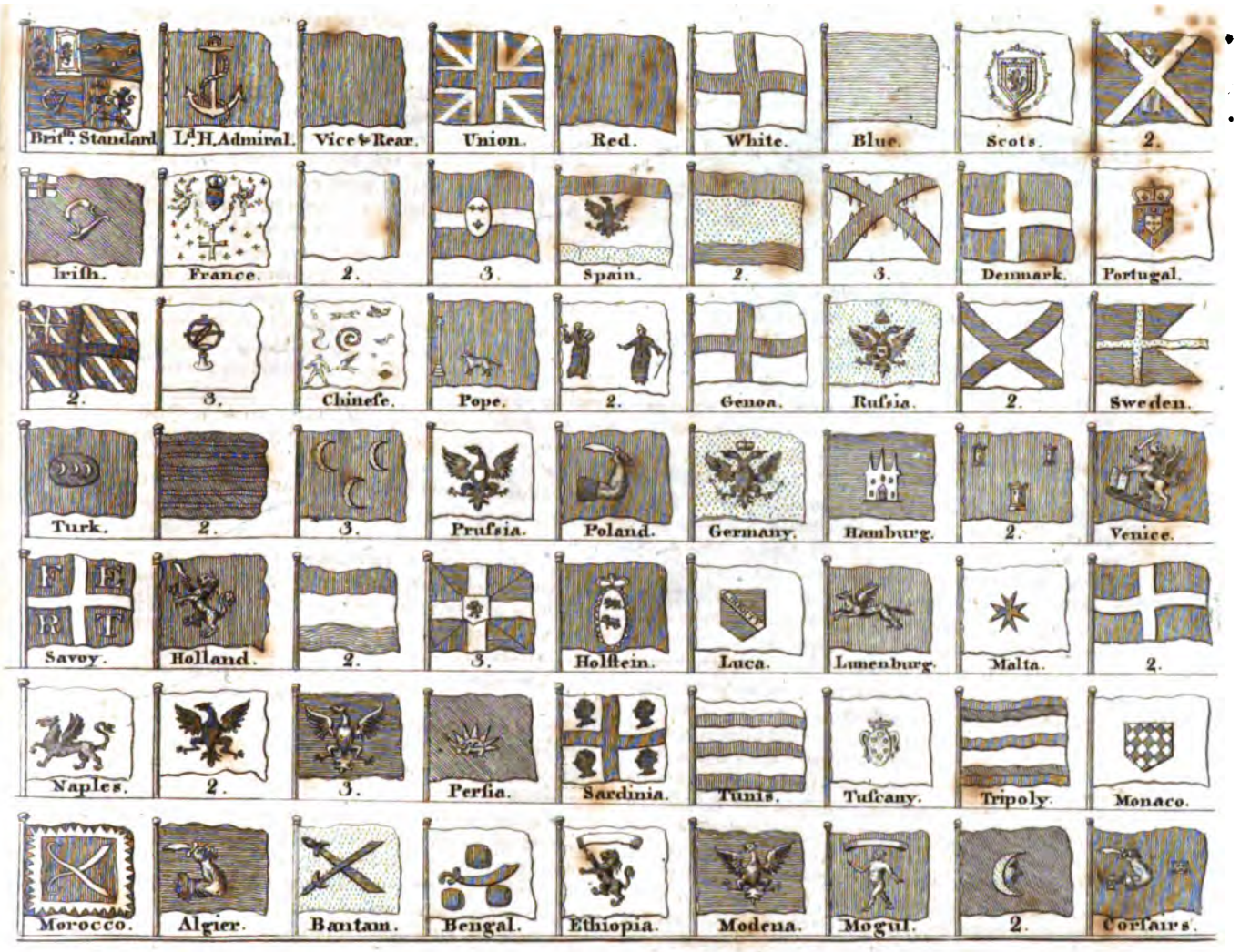
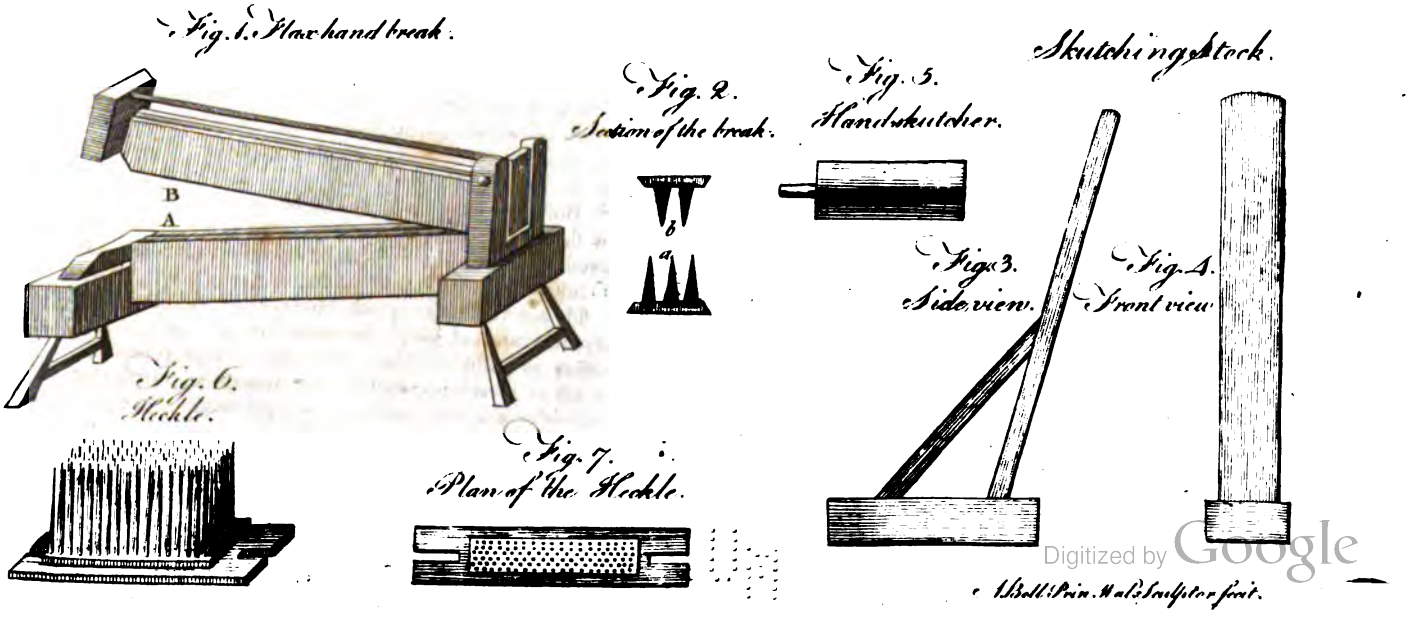
FLAGS.

Plate CXCIV.



FLAX.



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A. Bell Prin. Wal. Sculptor fecit.

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Flax. of cleaning it afterwards, appears to be the ſame impropriety as though we were to reſerve part of the dreſſing given to leather till after it is made into a glove.

" Should the plunging of the flax into the boiling water not ſuffice to make the boon brittle enough, as I am inclined to think it would not, then the common watering might be added; but in that caſe probably half the time uſually given to this watering would ſuffice, and the flax might then be laid in clear rivulets, without any apprehenſion of its infecting the water and poiſoning the fiſh, or of being diſcoloured itſelf; for the boiling water into which it had been previouſly put, would have extracted all the poiſonous vegetative ſap, which I preſume is what chiefly diſcolours the flax or kills the fiſh.

" On the ſuppoſition, that the uſe of boiling water in the preparation of flax may be found to be advantageous and profitable, I can recollect at preſent but one objection againſt its being generally adopted. Every flax grower, it may be ſaid, could not be expected to have conveniences for boiling water ſufficient for the purpoſe; the conſumption of water would be great; and ſome additional expence would be incurred. In anſwer to this, I ſhall obſerve, that I preſume any additional expence would be more than reimburſed by the better marketable price of the flax; for otherwiſe any new improvement, if it will not quit coſt, muſt be dropt, were it even the ſearching after gold. In a large cauldron a great deal of flax might be dipt in the ſame water, and the conſumption perhaps would not be more than a quart to each ſheaf. Even a large houſehold pot would be capable of containing one ſheaf after another; and I believe the whole objection would be obviated, were the practice to prevail with us, as in Flanders and Holland, that the flax-grower and the flax-dreſſer ſhould be two diſtinct profeſſions.

" I ſhall conclude with recommending to thoſe who are inclined to make experiments, not to be diſcouraged by the failure of one or two trials.—Perhaps the flax, inſtead of being juſt plunged into the ſcalding water, ought to be kept in it five minutes, perhaps a quarter of an hour, perhaps a whole hour. Should five minutes, or a quarter of an hour, or an hour, not be ſufficient to make the boon and harle eaſily ſeparate, it might perhaps be found expedient to boil the flax for more than an hour; and ſuch boiling when in this ſtate might in return ſave ſeveral hours boiling in the article of bleaching. It is not, I think, at all probable that the boiling of the flax with the boon in it would prejudice the harle; for in the courſe of its future exiſtence, it is made to be expoſed 20 or 40 times to this boiling trial; and if not detrimental in the one caſe, it is to be preſumed it would not be detrimental in the other. Perhaps, after the boiling, it would be proper to pile up the flax in one heap for a whole day, or for half a day, to occaſion ſome fermentation; or perhaps, immediately after the boiling, it might be proper to waſh it with cold water. The great object, when the flax is pulled, is to get the harle from the boon with as little loſs and damage as poſſible; and if this is accompliſhed in a more complete manner than uſual, conſiderable labour and expence will be ſaved in the future manufacturing of the flax. On this account I think much more would be gained than loſt, were the two or three laſt inches of the roots of the ſtems to be chopped off, or clipt off, previous to the flax being either watered or boiled. When the flax is watered, care ſhould be taken not to ſpread it out to dry, when there is a hazard of its being expoſed in its wet ſtate to froſt."

Flax || Flechier.

Flax made to reſemble Cotton. In the Swediſh Tranſactions for the year 1747, a method is given of preparing flax in ſuch a manner as to reſemble cotton in whiteneſs and ſoftneſs, as well as in coherence. For this purpoſe, a little ſea-water is to be put into an iron pot or an untinned copper-kettle, and a mixture of equal parts of birch-aſhes and quicklime ſtrewed upon it: A ſmall bundle of flax is to be opened and ſpread upon the ſurface, and covered with more of the mixture, and the ſtratification continued till the veſſel is ſufficiently filled. The whole is then to be boiled with ſea-water for ten hours, freſh quantities of water being occaſionally ſupplied in proportion to the evaporation, that the matter may never become dry. The boiled flax is to be immediately waſhed in the ſea by a little at a time, in a baſket, with a ſmooth ſtick at firſt while hot; and when grown cold enough to be borne by the hands, it muſt be well rubbed, waſhed with ſoap, laid to bleach, and turned and watered every day. Repetitions of the waſhing with ſoap expedite the bleaching; after which the flax is to be beat, and again well waſhed; when dry, it is to be worked and carded in the ſame manner as common cotton, and preſſed betwixt two boards for 48 hours. It is now fully prepared and fit for uſe. It loſes in this proceſs near one-half its weight, which is abundantly compenſated by the improvement made in its quality.

The filamentous parts of different vegetables have been employed in different countries for the ſame mechanic uſes as hemp and flax among us. See FILAMENT.

Earth-Flax. See AMIANTHUS.

New-Zealand Flax-Plant. See PHORMIUM.

Toad-Flax. See LINARIA.

FLEA, in zoology. See PULEX.

Flea-Bane, in botany. See CONYZA.

Flea-Bitten, that colour of a horſe which is white or grey, ſpotted all over with dark reddiſh ſpots.

FLEAM, in ſurgery and farriery, an inſtrument for letting blood of a man or horſe. A caſe of fleams, as it is called by farriers, comprehends ſix ſorts of inſtruments; two hooked ones, called *drawers*, and uſed for cleaning wounds; a pen-knife; a ſharp-pointed lancet for making inciſions; and two fleams, one ſharp and the other broad-pointed. Theſe laſt are ſomewhat like the point of a lancet, fixed in a flat handle, and no longer than is juſt neceſſary to open the vein.

FLECHIER (Eſprit), biſhop of Niſmes, one of the moſt celebrated preachers of his age, and the publiſher of many panegyrics and funeral orations, was born at Perne in Avignon in 1632. He was nominated to the biſhopric of Lavaur in 1685, and tranſlated to Niſmes in 1687. At this latter place he founded an academy, and took the preſidentſhip upon himſelf: his own palace was indeed a kind of academy, where he applied

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Flecknoe || Fleet.

applied himself to train up orators and writers, who might serve the church, and do honour to the nation. He published, besides his panegyrics and funeral orations, 1. An History of the Emperor Theodosius, that of Cardinal Ximenes, and that of Cardinal Commendon. 2. Several Sermons. 3. Miscellaneous Works. 4. Letters, &c. He died in 1710.

FLECKNOE (Richard), an English poet in the reign of Charles II. more remarkable for Mr Dryden's satire on him than for any works of his own. He is said to have been originally a jesuit, and to have had good English connections in the Catholic interest. When Dryden lost the place of poet-laureat on the revolution, its being conferred on Flecknoe, for whom he had a settled aversion, gave occasion to his poem intitled *Mac Flecknoe;* one of the best written satires in our language, and from which Pope seems to have taken the hint for his Dunciad. Flecknoe wrote some plays; but could never get more than one of them acted, and that was damned.

FLEECE, the covering of wool shorn off the bodies of sheep. See WOOL.

Golden FLEECE. See ARGONAUTS, and *Golden Fleece.*

FLEET, commonly implies a company of ships of war, belonging to any prince or state: but sometimes it denotes any number of trading ships employed in a particular branch of commerce.

The admirals of his Britannic majesty's fleet are divided into three squadrons, *viz.* the red, the white, and the blue. When any of these officers are invested with the command of a squadron or detachment of men of war, the particular ships are distinguished by the colours of their respective squadron: that is to say, the ships of the red squadron wear an ensign whose union is displayed on a red field; the ensigns of the white squadron have a white field; and those of the blue squadron a blue field; the union being common to all three. The ships of war, therefore, are occasionally annexed to any of the three squadrons, or shifted from one to another.

Of whatsoever number a fleet of ships of war is composed, it is usually divided into three squadrons; and these, if numerous, are again separated into divisions. The admiral, or principal officer, commands the centre; the vice-admiral, or second in command, superintends the van-guard; and the operations of the rear are directed by the rear-admiral, or the officer next in rank. See the article DIVISION.

The disposition of a fleet, while proceeding on a voyage, will in some measure depend on particular circumstances; as the difficulty of the navigation, the necessity of dispatch, according to the urgency or importance of the expedition, or the expectation of an enemy in the passage. The most convenient order is probably to range it into three lines or columns, each of which is parallel to a line close-hauled according to the tack on which the line of battle is designed to be formed. This arrangement is more useful than any, because it contains the advantages of every other form, without their inconveniences. The fleet being thus more inclosed will more readily observe the signals, and with greater facility form itself into the line of battle; a circumstance which should be kept in view in every order of sailing. See *Naval* TACTICS.

Fleet || Fleth.

FLEET, is also a noted prison in London, where persons are committed for contempt of the king and his laws, particularly of his courts of justice: or for debt, where any person will not or is unable to pay his creditors.

There are large rules and a warden belonging to the fleet prison; which had its name from the float or fleet of the river or ditch, on the side whereof it stands.

FLEETWOOD (William), a very learned English bishop in the beginning of the 18th century, of an ancient family in Lancashire. He distinguished himself during king William's reign, by his *Inscriptionum Antiquarum Sylloge,* by several sermons he preached on public occasions, and by his Essay on Miracles. He was designed by king William to a canonry of Windsor. The grant did not pass the seals before the king's death; but the queen gave it him, and he was installed in 1702. In 1703, he took a resolution to retire; and in 1707, published, without his name, his *Chronicon Pretiosum.* In 1708, he was nominated by the queen to the see of St Asaph. The change of the queen's ministry gave him much regret. In 1715, he published a pamphlet intitled "The 13th chapter of the Romans vindicated from the abusive senses put upon it." In 1714 he was translated to the bishopric of Ely; and died in 1723, aged 67. He published several other sermons and tracts, and was a man of great learning and exemplary piety.

FLEMINGIANS, or FLANDRIANS, in ecclesiastical history, a sect of rigid anabaptists, who acquired this name in the 16th century, because most of them were natives of Flanders, by way of distinction from the WATERLANDIANS. In consequence of some dissensions among the Flemingians relating to the treatment of excommunicated persons, they were divided into two sects, distinguished by the appellations of *Flandrians* and *Frieslanders,* who differed from each other in their manners and discipline. Many of these in process of time came over to the moderate community of the Waterlandians, and those who remained separate are still known by the name of the Old Flemingians or Flandrians; but they are comparatively few in number. These maintain the opinion of Menno with respect to the incarnation of Christ; alleging, that his body was produced by the creating power of the Holy Ghost, and not derived from his mother Mary.

FLEMISH, or the FLEMISH TONGUE, is that which we otherwise call *Low Dutch,* to distinguish it from the *German,* whereof it is a corruption and a kind of dialect. See GERMAN.

It differs from the *Walloon,* which is a corruption of the French language. The Flemish is used through all the provinces of the Netherlands.

Flemish-Bricks, a neat, strong, yellow kind of bricks, brought from Flanders, and commonly used in paving yards, stables, &c. being preferable for such purposes to the common bricks. See the article BRICKS.

FLESH, in anatomy, a compound substance, consisting of the various softer solids of the animal body, and so denominated in contradistinction to bones. See ANATOMY, *passim.*

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Fleſh || Fletcher.

FLESH is alſo uſed, in theology, in ſpeaking of the myſteries of the incarnation and euchariſt. "The Word was made *fleſh*," *Verbum* caro *factum eſt*.

The Romaniſts hold, that the bread in the ſacrament of the ſupper is turned into the real fleſh of Jeſus Chriſt. See TRANSUBSTANTIATION.

FLESH is ſometimes alſo uſed by botaniſts for the ſoft pulpy ſubſtance of any fruit, incloſed between the outer rind or ſkin and the ſeeds or ſtone; or for that part of a root, fruit, &c. fit to be eaten.

FLESH-Colour. See CARNATION.

FLETA, the name given to an unknown writer who lived about the end of the reign of Edward II. and beginning of Edward III. and who being a priſoner in the Fleet, wrote there an excellent treatiſe on the common law of England.

FLETCHER. See *BEAUMONT and Fletcher*.

FLETCHER (Andrew) of Salton, a celebrated Scots patriot and political writer, was deſcended from an ancient family who trace their origin to one of the followers of William the Conqueror. He was the ſon of Sir Robert Fletcher of Salton and Innerpeffer, and born in the year 1650. The tuition of our author was committed by his father, on his death-bed, to Mr (afterwards Biſhop) Burnet, then his pariſh-miniſter; by whoſe care he received a pious, learned, and polite education. Endowed with uncommon genius, and poſſeſſed of virtues and abilities peculiarly ſuited to the times in which he lived, Mr Fletcher quickly ſhone forth the ornament of his country, and the champion of its freedom. Having in the courſe of his claſſical ſtudies and hiſtorical reading been impreſſed with an enthuſiaſtic admiration both of ancient and modern republics, he had early contracted an ardent love of liberty, and an averſion to arbitrary rule. Hence his ſpirit the more readily took alarm at certain meaſures in the reign of Charles II. Being knight of the ſhire for Lothian to that parliament where the duke of York was commiſſioner, he openly oppoſed the deſigns of that prince and the bill of acceſſion. He had a ſhare with lord viſcount Stair in framing the teſt-act, by which the duke of York complained that he loſt Scotland. On theſe accounts he became peculiarly obnoxious to the duke; and was at laſt obliged to flee to Holland, to avoid the fatal conſequences of proſecutions which on various pretences were commenced againſt him. Being cited before the privy-council and juſticiary courts, and not appearing, he was declared traitor, and his eſtate confiſcated.

In Holland he and Mr Baillie of Jerviſwood were the only perſons whom the earl of Argyle conſulted concerning the deſigns which were then in agitation. In 1681 they came over to England, in order to concert matters with their party in that country; and were the only two who were intruſted ſo far as to be admitted to the ſecrets of lord Ruſſell's council of ſix. Mr Fletcher managed his part of the negociation with ſo much addreſs, that adminiſtration could find no pretext for ſeizing him: nor could they fix upon him thoſe articles on account of which Mr Baillie was condemned; to whoſe honour let it be remembered, that although offered a pardon on condition of his accuſing his friend, he perſiſted in rejecting the propoſal with indignation.

Mr Fletcher having joined the duke of Monmouth upon his landing, received a principal command under him. But the duke was deprived of his ſervices on the following occaſion, as related by Sir John Dalrymple. Being ſent upon an expedition, and not eſteeming "times of danger to be times of ceremony," he had ſeized for his own riding the horſe of a country gentleman [the mayor of Lynne] which ſtood ready equipt for its maſter. The maſter, hearing this, ran in a paſſion to Fletcher, gave him opprobrious language, ſhook his cane, and attempted to ſtrike. Fletcher, though rigid in the duties of morality, yet having been accuſtomed to foreign ſervices both by ſea and land, in which he had acquired high ideas of the honour of a ſoldier and a gentleman, and of the affront of a cane, pulled out his piſtol, and ſhot him dead on the ſpot. The action was unpopular in countries where ſuch refinements were not underſtood. A clamour was raiſed againſt it among the people of the country: in a body they waited upon the duke with their complaints; and he was forced to deſire the only ſoldier, and almoſt the only man of parts, in his army, to abandon him. With Fletcher all Monmouth's chance of ſucceſs in war left him." But, in a manuſcript memoir belonging to the family, we have the following notice concerning Mr Fletcher's connection with Monmouth, in which his ſeparation from that prince is very differently accounted for: "To lord Mariſchal Mr Fletcher explained the motives which induced him firſt to join, and afterwards abandon, the duke of Monmouth. The former he aſcribed to the duke's manifeſto in Scotland relating to religion, and in England to liberty. For the latter he accounted by the diſguſt produced in his own mind and that of his aſſociates, when the duke declared himſelf king, and broke faith with all who embarked with him on his principles. He complained heavily of the account commonly given of the death of the mayor of Lynne; and mentioned to lord Mariſchal, in proof of the contrary, that he did not leave the duke till he came to Taunton, where he was proclaimed king, ſeveral weeks after the death of the mayor of Lynne."

Fletcher. *Memoirs of Great Britain and Ireland.*

Seeing all the efforts of himſelf and his friends in favour of liberty fruſtrated at Taunton, he endeavoured to ſecure his own perſonal freedom by taking his paſſage in the firſt ſhip bound to a foreign country. It was his misfortune to land in Spain; where he was immediately arreſted, caſt into priſon, and guarded by three different bands of ſoldiers, till a veſſel ſhould be prepared to carry him a victim in chains to the court of London. But on the morning before the ſhip could ſail, whilſt he looked penſive through the bars that ſecured the window of his room, he was hailed by a venerable perſonage who made ſigns to ſpeak with him. The priſon-doors he found open; and whilſt his friendly conductor waved to him to follow him, he paſſed through three different guards of ſoldiers all faſt aſleep. Without being permitted to offer his thanks to his deliverer, he found himſelf obliged to proſecute with all ſpeed the journey, in which he was directed by a perſon concerning whom he could never collect any information; and in diſguiſe he proceeded in ſafety through Spain. He felt a peculiar pleaſure in relating to his friends inſtances of the care of Providence which he had experienced during his exile; and entertained them often with narratives of this kind, which he always mingled with

Memoirs of the family of Salton. MS.

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Fletcher. with religious reflections. Of theſe, another may be here mentioned. Happening in the evening to paſs the ſkirt of a wood at a few miles diſtance from a city where he intended to lodge, he came to a place where two roads met. After he had entered upon the road on the right, he was accoſted by a female of a reſpectable figure, who warned him to turn back, and take the road on the left; for that in the other there was danger which he could not eſcape if he continued to proceed. His friendly monitor ſuddenly retired into the wood, out of which ſhe had iſſued no leſs unexpectedly. Having arrived at the city, the inhabitants were ſoon after alarmed by an account of the robbery and murder of ſeveral travellers who that evening had fallen into the hands of a banditti upon the very way in which he had intended to travel. From theſe and other inſtances of preſervation from dangers, the devotion of his mind, habituated from his infancy to an intercourſe with heaven, led him to conclude that he was in a peculiar manner the care of Providence, and that in critical caſes his underſtanding received its direction from a ſupernatural impulſe.

During his exile, he maintained a frequent and extenſive correſpondence with the friends of liberty at home; and he partly employed himſelf in making a curious collection of books, which compoſe the beſt private library in Scotland. But his genius alſo prompted him to engage in more active employments. He repaired to Hungary, and ſerved ſeveral campaigns as a volunteer under the duke of Lorrain with great reputation. At length, underſtanding that the great deſign then projecting in Holland, and upon the iſſue of which he conſidered the liberties of Britain to be ſuſpended, had attained a conſiderable degree of maturity, he haſtened thither; where his counſels and addreſs were of eminent ſervice. He came over with king William; and in zeal, activity, penetration, and political ſkill, proved inferior to none of the leaders in the Revolution.

Such, however, was his magnanimity, that from a ſurvey of King William's papers it appears, that while others laboured to turn this grand event to the emolument of themſelves and the aggrandiſement of their family, Mr Fletcher aſked nothing. His eſtate had been forfeited, and his houſe abandoned to military diſcretion; his fortune was greatly ſhattered, and his family reduced to circumſtances of diſtreſs. Nothing was given him in recompence of all his ſufferings. On the contrary, he, together with the duke of Hamilton, was diſtinguiſhed by marks of royal and miniſterial diſlike. Still, whatever private reſentment he might entertain, it appeared that his ruling principle was the good of his country; and that to this grand object of his heart he was willing to ſacrifice all perſonal conſiderations. For when, in 1692, the abdicated king meditated an invaſion, Mr Fletcher addreſſed a letter (preſerved in Sir John Dalrymple's Collection) to the duke of Hamilton, in which every argument is employed with ſkill and energy to engage his Grace to forget his injuries, and in the preſent criſis to employ the extenſive influence and authority he then poſſeſſed in the cauſe of freedom and of his country. This letter produced its full effect; and the duke returned to his duty, from which he had in part begun to deviate.

To follow our author through all the mazes of his Fletcher. political life ſubſequent to the Revolution, is beyond our purpoſe, and would exceed our limits. One or two circumſtances more ſhall therefore ſuffice. Being elected a member for the parliament 1685, he ſhowed an uniform zeal for the intereſt of his country. The thought of England's domineering over Scotland was what his generous ſoul could not endure. The indignities and oppreſſion which Scotland lay under galled him to the heart; ſo that in his learned and elaborate diſcourſes, he expoſed them with undaunted courage and pathetical eloquence.—In that great event, the Union, he performed eſſential ſervice. He got the act of ſecurity paſſed, which declared that the two crowns ſhould not paſs to the ſame head till Scotland was ſecured in her liberties civil and religious. Therefore lord Godolphin was forced into the Union, to avoid a civil war after the queen's demiſe. Although Mr Fletcher diſapproved of ſome of the articles, and indeed of the whole frame of the Union; yet, as the act of ſecurity was his own work, he had all the merit of that important tranſaction.

We muſt not omit mentioning, that in the ardor of his political career Mr Fletcher forgot not the intereſts of the place that gave him birth. He eſteemed the education of youth one of the nobleſt objects of government. On this ſubject he wrote a treatiſe, ſtill extant, moſt characteriſtic of himſelf; and he eſtabliſhed at Salton a foundation for the ſame purpoſe, of great utility while it laſted.

This great man died at London in 1716, aged 66. His remains were conveyed to Scotland, and depoſited in the family vault at Salton.

That Mr Fletcher received neither honours nor emoluments from king William, may perhaps be in part attributed to himſelf; a circumſtance, however, which muſt add greatly to the luſtre of his character. His uncomplying virtue, and the ſternneſs of his principles, were ill calculated to conciliate courtly favour. He was ſo zealous an aſſertor of the liberties of the people, that he was too jealous of the growing power of all princes; in whom he thought ambition ſo natural, that he was not for truſting the beſt of kings with the power which ill ones might make uſe of againſt their ſubjects: he was of opinion that all princes were made by, and for the benefit of, the people; and that they ſhould have no power but that of doing good. This, which made him oppoſe king Charles and invade king James, led him alſo to oppoſe the giving ſo much power to king William, whom he would never ſerve after his eſtabliſhment. So we are told by the author of Short Political Characters, a MS. in the library of the late T. Rawlinſon, Eſq.—Mr Lockhart, in his Memoirs, p. 72. expreſſes a belief that his averſion to the Engliſh and to the Union was ſo great, that, in revenge to them, he was inclined to ſide with the abdicated family: "But (adds he) as that was a ſubject not fit to be entered upon with him, this is only a conjecture from ſome inuendos I have heard him make: but ſo far is certain, he liked, commended, and converſed with high-flying Tories, more than any other ſet of men; acknowledging them to be the beſt countrymen, and of moſt honour, integrity, and ingenuity." It ſeems difficult to reconcile this with Mr Fletcher's avowed principles and the general tenor of his con-

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Fletcher, Fletewood.

duct. May we ſuppoſe, that chagrin, if not at the neglect or the ill treatment which he had himſelf received from government ſince the Revolution, yet at the public meaſures relating to his native country, might have occaſioned him to relent in his ſentiments with regard to the exiled family!—In the family-memoirs already quoted, we are informed, That "Lord Mariſchal held Mr Fletcher's character in high admiration;" and that, "when governor of Neufchatel, where Rouſſeau reſided about the year 1766, he prevailed with this very extraordinary genius to write the life of a man whoſe character and actions he wiſhed to have tranſmitted to poſterity with advantage. For this purpoſe, his lordſhip applied to an honourable relation of Mr Fletcher's for materials, which by him were tranſmitted to lord Mariſchal: but the deſign failed through Rouſſeau's deſultory and capricious diſpoſition." This anecdote muſt appear incompatible with the known loyalty and attachments of the Earl Mariſchal, unleſs we ſuppoſe him to have been privy to ſome ſuch ſentiments of Mr Fletcher as thoſe alluded to by Mr Lockhart: for how could we ſuppoſe him anxious to promote a compoſition, in which the taſk would be to celebrate principles diametrically oppoſite to his own, and to applaud actions ſubverſive of that royal family in whoſe cauſe he had ventured his life, and forfeited his fortune, and foregone his country!—But however theſe circumſtances may be reconciled,—as the integrity, diſintereſtedneſs, and public ſpirit of Mr Fletcher, have been univerſally acknowledged, there is reaſon to believe, that all his ſentiments and actions were founded in honour, and that he never once purſued a meaſure further than he judged it to be for the intereſt of his country.

Mr Fletcher was maſter of the Engliſh, Latin, Greek, French, and Italian languages; and well verſed in hiſtory, the civil law, and all kinds of learning. In his travels, he had not only acquired conſiderable knowledge in the art of war, but alſo became verſant in the reſpective intereſts of the ſeveral princes and ſtates of Europe. In private life, he was affable to his friends, and free from all manner of vice. He had a penetrating, clear, and lively, apprehenſion; but is ſaid to have been too much wedded to opinions, and impatient of contradiction.—He poſſeſſed an uncommon elevation of mind, accompanied with a warmth of temper, which would ſuffer him to brook from no rank among men, nor in any place, an indignity. Of this he exhibited a ſingular proof in the Scots parliament. The earl of Stair, ſecretary of ſtate and miniſter for Scotland, having in the heat of debate uſed an improper expreſſion againſt Mr Fletcher, he ſeized him by his robe, and inſiſted upon public and immediate ſatisfaction. His Lordſhip was obliged inſtantly to beg his pardon in preſence of parliament.

Mr Fletcher was by far the fineſt ſpeaker in the parliament of Scotland: the earl of Stair alone rivalled him. The latter was famed for a ſplendid, the former for a cloſe and nervous, eloquence. He formed his ſtyle on the models of antiquity; and the ſmall volume of his works, Sir John Dalrymple obſerves, tho' imperfectly collected, is one of the very few claſſical compoſitions in the Engliſh language.

FLETEWOOD (William), an eminent Engliſh lawyer and recorder of London, in the reign of queen Elizabeth. He was very zealous in ſuppreſſing maſs-houſes, and committing Popiſh prieſts: but once ruſhing in upon maſs at the Portugueſe ambaſſador's houſe, he was committed to the Fleet for breach of privilege, but ſoon releaſed. Mr Wood ſays, "He was a learned man, and a good antiquary, but of a marvellous merry and pleaſant conceit." He was a good popular ſpeaker, and wrote well upon ſubjects of government. His principal works are, 1. *Annalium tam regum Edwardi V. Richardi III. & Henrici VII. quam Henrici VIII.* 2. A Table of the Reports of Edmund Plowden. 3. The Office of a Juſtice of Peace. He died about the year 1593.

Flevillea || Flight.

FLEVILLEA, in botany: A genus of the hexandria order, belonging to the dioecia claſs of plants. The male calyx and corolla are quinquefid; the ſtamina five; the nectarium five converging filaments. The female calyx is quinquefid; there are three ſtyli; fruit an hard trilocular barky apple.

FLEURI (Claude), one of the beſt French critics and hiſtorians of his age, was born at Paris in 1640. He applied himſelf to the law, was made advocate for the parliament of Paris, and attended the bar nine years; he then entered into orders, and was made preceptor to the princes of Conti. In 1689, the king made him ſub-preceptor to the dukes of Burgundy, Anjou, and Berry; and in 1706, when the education of theſe young princes was completed, the king gave him the priory of Argenteville belonging to the Benedictines in the dioceſe of Paris. In 1716, he was choſen counſellor to Louis XV. and died in 1723. He was the author of a great number of eſteemed French works; the principal of which are, 1. An eccleſiaſtical hiſtory, in 20 volumes, the laſt of which ends with the year 1414. 2. The manners of the Iſraelites and Chriſtians. 3. Inſtitutions of eccleſiaſtical law. 4. An hiſtorical catechiſm. 5. On the choice and method of ſtudy. 6. The duties of maſters and ſervants, &c.

FLEURI (Andrew Hercules de), biſhop of Frejus, preceptor to Louis XV. grand almoner to the queen, cardinal and miniſter of ſtate, was born in 1653, and died in 1743. He was an able negociator; and diſtinguiſhed himſelf during his miniſtry by his probity, his zeal for the happineſs of his country, and his pacific diſpoſition.

FLEXIBLE, in phyſics, a term applied to bodies capable of being bent or diverted from their natural figure or direction.

FLEXOR, in anatomy, a name applied to ſeveral muſcles, which are ſo called from their office, which is to bend the parts to which they belong; in oppoſition to the *extenſors*, which open or ſtretch them. See Anatomy, *Table of the Muſcles*.

FLIGHT, the act of a bird in flying; or the manner, duration, &c. thereof.

Almoſt every kind of bird has its particular flight: the eagle's flight is the higheſt; the flight of the ſparrow-hawk and vulture is noble, and fit for high enterprize and combat. The flight of ſome birds is low, weak, and tranſient; the flight of the partridge and pheaſant is but of ſhort continuance; that of the dove is laboured; that of the ſparrow undulatory, &c.

The augurs pretended to foretel future events from the flight of birds. See Augury.

Flight. In melting the lead-ore in the works at

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Flint. Mendip, there is a ſubſtance which flies away in the ſmoke, which they call the flight. They find it ſweetiſh upon their lips, if their faces happen to be in the way of the ſmoke, which they avoid as much as poſſible. This, falling on the graſs, kills cattle that feed thereon; and, being gathered, and carried home, kills rats and mice in their houſes; that which falls on the ſand, they gather, and melt upon a flag-hearth into ſhot and ſheet-lead.

FLINT, in natural hiſtory, a kind of ſemitranſparent or quite opaque ſtones; generally of a roundiſh form, and covered with white cruſt; of a ſmooth, uniform, ſhining texture; ſo hard, that they will ſtrike fire with ſteel; calcinable by fire, after which they become white, friable, and, according to Henckel, heavier than before, and ſoluble by acids; vitrifiable only by the very violent heat of the largeſt ſpeculums, ſuch as that of Villette, and not even by the focus of one of Tſchirnhauſen's lenſes, according to an experiment of Neumann. They are found generally in beds of chalk and of ſand; but never forming entire ſtrata of rock as jaſper does. By long expoſure to air and the ſun, they ſeem to decay, to loſe their luſtre, their firmneſs of texture, and to be changed to a white calcareous earth or chalk. Hence they are almoſt always found covered with a white chalky cruſt. They are alſo convertible into a calcareous earth by fuſion, or vitrification with ſo much fixed alkali that they ſhall reſolve into a liquid maſs called the *liquamen* or *oil of flints*, and by precipitation from the fixed alkali by means of acids. See CHEMISTRY, n° 1069.

This genus of ſtones, or ſiliceous earths, Cronſtedt conſiders as of an intermediate nature between the quartz and jaſper; both of which it ſo nearly reſembles, that it is difficult to diſtinguiſh them. Our author characteriſes it in the following manner: 1. It is more uniformly ſolid and not ſo much cracked in the maſs as quartz, but more pellucid than the jaſper. 2. It bears the air better than the jaſper, but worſe than the quartz. 3. For the purpoſe of glaſs-making it is better than jaſper, but not quite ſo good as quartz. 4. Whenever it has had an opportunity of ſhooting into cryſtals, thoſe of quartz are always found in it; as if the quartz made one of its conſtituent parts, and had been ſqueezed out of it. This may be ſeen in every hollow flint and its clefts, which are always filled up with quartz. 5. It often ſhows moſt evident marks of having been originally in a ſoft and ſlimy tough ſtate like jelly.—To theſe properties the following are added by other authors. 7. When broken, it is ſcaly, generally unequal, and cracks into thin lamellæ. 8. In a calcining heat it becomes opaque, white, and milky.

Breaking of FLINTS. The art of cutting, or rather breaking, flint ſtones into uniform figures, is by ſome ſuppoſed to be one of the arts now loſt. That it was known formerly, appears from the ancient Bridewell at Norwich, from the gate of the Auguſtin friars at Canterbury, that of St John's Abbey at Colcheſter, and the gate near Whitehall, Weſtminſter. But that the art is not loſt, and that the French know it, appears from the platform on the top of the royal obſervatory at Paris; which, inſtead of being leaded, is paved with flint cut or broken into regular figures. But we know not that this art hath been any where deſcribed.

FLINTS, in the glaſs trade. The way of preparing flints for the niceſt operations in the glaſs-trade is this. Chooſe the hardeſt flints, ſuch as are black and will reſiſt the file, and will grow white when calcined in the fire. Cleanſe theſe of the white cruſt that adheres to them, then calcine them in a ſtrong fire, and throw them while red-hot into cold water; waſh off the aſhes that may adhere to them, and powder them in an iron mortar, and ſift them through a very fine ſieve; pour upon this powder ſome weak aquafortis, or the phlegm of aquafortis, to diſſolve and take up any particles of iron it may have got from the mortar; ſtir this mixture ſeveral times, then let it reſt, and in the morning pour off the liquor, and waſh the powder ſeveral times with hot water, and afterwards dry it for uſe. You will thus have a powder for making the pureſt glaſs as perfectly fine and faultleſs as if you had uſed rock-cryſtal itſelf. Flint | Float

The waſhing off the ferrugineous particles with aquafortis is not neceſſary when the glaſs intended to be made is to be tinged with iron afterwards; but when meant to be a pure white, this is the method that will ſecure ſucceſs.

FLINT, the chief town of Flintſhire, in North Wales. It is commodiouſly ſeated on the river Dee; and is but a ſmall place, though it ſends one member to parliament. It was formerly noted for its caſtle, where Richard II. took ſhelter on his arrival from Ireland; but having quitted it, he was taken priſoner by the duke of Lancaſter. The caſtle now is in a ruinous condition. This caſtle ſtands cloſe to the ſea on a rock, which in various parts forms ſeveral feet of its foundation. It covers about three quarters of an acre. The aſſizes are ſtill held in the town. It is 195 miles north-weſt of London.

FLINTSHIRE, a county of Wales, bounded on the north-eaſt and eaſt by an arm of the ſea, which is properly the mouth of the river Dee; on the north-weſt by the Iriſh Sea; and on the ſouth-ſouth-weſt and weſt by Denbighſhire. It is the leaſt of all the counties in Wales, being but 33 miles in length and 9 in breadth. It is divided into five hundreds; in which are two market-towns and 28 pariſhes, with 32,400 inhabitants. The greateſt part of this county lies in the dioceſe of St Aſaph, and the reſt belongs to that of Cheſter. It ſends two members to parliament, one for the county and one for Flint; and pays one part of the land-tax. The air is cold, but healthful. It is full of hills, intermixed with a few valleys, which are very fruitful, producing ſome wheat and plenty of rye. The cows, though ſmall, yield a great quantity of milk in proportion to their ſize, and are excellent beef. The mountains are well ſtored with lead, coal, and mill-ſtones. This county alſo produces good butter, cheeſe, and honey; of which laſt the natives make metheglin, a wholeſome liquor much uſed in theſe parts.

FLIP, a ſort of ſailors drink, made of malt liquor, brandy, and ſugar, mixed.

FLOAT, a certain quantity of timber bound together with rafters athwart, and put into a river to be conveyed down the ſtream; and even ſometimes to carry burdens down a river with the ſtream.

Float-Boards, thoſe boards fixed to water-wheels of under-ſhot-mills, ſerving to receive the impulſe of the ſtream, whereby the wheel is carried round. See the articles WHEEL and MILL.

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Floats ‖ Floor.

It is no advantage to have too great a number of float-boards; becauſe, when they are all ſtruck by the water in the beſt manner that it can be brought to come againſt them, the ſum of all the impulſes will be but equal to the impulſe made againſt one float-board at right angles, by all the water coming out of the penſtock through the opening, ſo as to take place on the float-board. The beſt rule in this caſe is, to have juſt ſo many, that each of them may come out of the water as ſoon as poſſible, after it has received and acted with its full impulſe. As to the length of the float-board, it may be regulated according to the breadth of the mill. See the article MILL.

Floats for Fiſhing. See *Fishing-Floats.*

FLOATAGES, all things floating on the ſurface of the ſea or any water: a word much uſed in the commiſſions of water-bailiffs.

Floating-Bridge. See BRIDGE.

Flock-Paper. See PAPER.

FLOOD, a deluge or inundation of waters. See DELUGE.

FLOOD is alſo uſed in ſpeaking of the tide. When the water is at loweſt, it is called *flood;* when riſing, *young*, or *old flood;* when at higheſt, *high flood;* when beginning to fall, *ebb-water.*

Flood-mark, the mark which the ſea makes on the ſhore at flowing water and the higheſt tide: it is alſo called *high-water mark.*

FLOOK of an anchor. See ANCHOR.

FLOOKING, among miners, a term uſed to expreſs a peculiarity in the load of a mine. The load or quantity of ore is frequently intercepted in its courſe by the croſſing of a vein of earth or ſtone, or ſome different metallic ſubſtance; in which caſe the load is moved to one ſide, and this tranſient part of the land is called a *flooking.*

FLOOR, in building, the underſide of a room, or that part we walk on.

Floors are of ſeveral ſorts; ſome of earth, ſome of brick, others of ſtone, others of boards, &c.

For brick and ſtone FLOORS, ſee PAVEMENT.

For boarded FLOORS, it is obſervable, that the carpenters never floor their rooms with boards till the carcaſe is ſet up, and alſo incloſed with walls, leſt the weather ſhould injure the flooring. Yet they generally rough-plane their boards for the flooring before they begin any thing elſe about the building, that they may ſet them by to dry and ſeaſon, which is done in the moſt careful manner. The beſt wood for flooring is the fine yellow deal well ſeaſoned, which, when well laid, will keep its colour for a long while; whereas the white ſort becomes black by often waſhing, and looks very bad. The joints of the boards are commonly made plain, ſo as to touch each other only; but, when the ſtuff is not quite dry, and the boards ſhrink, the water runs through them whenever the floor is waſhed, and injures the ceiling underneath. For this reaſon they are made with feather edges, ſo as to cover each other about half an inch, and ſometimes they are made with grooves and tenons; and ſometimes the joints are made with dove-tails; in which caſe the lower edge is nailed down and the next drove into it, ſo that the nails are concealed. The manner of meaſuring floors is by ſquares of 10 feet on each ſide, ſo that taking the length and breadth and multiplying them together and cutting off two decimals, the content of a floor in ſquare will be given. Thus 18 by 16 gives 288 or 2 ſquares and 88 decimal parts.

Floor, Flora.

Earthen-Floors, are commonly made of loam, and ſometimes, eſpecially to make malt on, of lime, and brookſand, and gun-duſt, or anvil-duſt from the forge.

Ox-blood and fine clay, tempered together, Sir Hugh Plat ſays, make the fineſt floor in the world.

The manner of making earthen floors for plain country habitations is as follows: Take two thirds of lime, and one of coal-aſhes well ſifted, with a ſmall quantity of loam clay; mix the whole together, and temper it well with water, making it up into a heap: let it lie a week or ten days and then temper it over again. After this, heap it up for three or four days, and repeat the tempering very high, till it become ſmooth, yielding, tough, and gluey. The ground being then levelled, lay the floor therewith about 2½ or 3 inches thick, making it ſmooth with a trowel: the hotter the ſeaſon is, the better; and when it is thoroughly dried, it will make the beſt floor for houſes, eſpecially malt-houſes.

If any one would have their floors look better, let them take lime made of rag-ſtones, well tempered with whites of eggs, covering the floor about half an inch thick with it, before the under flooring is too dry. If this be well done, and thoroughly dried, it will look when rubbed with a little oil as tranſparent as metal or glaſs. In elegant houſes, floors of this nature are made of ſtucco, or of plaſter of Paris beaten and ſifted, and mixed with other ingredients.

Floor of a ſhip, ſtrictly taken, is only ſo much of her bottom as ſhe reſts on when aground.

Such ſhips as have long, and withal broad floors, lie on the ground with moſt ſecurity, and are not apt to heel, or tilt on one ſide; whereas others, which are narrow in the floor, or, in the ſea-phraſe, *cranked by the ground*, cannot be grounded without danger of being overturned.

Floor-Timbers, in a ſhip, are thoſe parts of a ſhip's timbers which are placed immediately acroſs the keel, and upon which the bottom of the ſhip is framed; to theſe the upper parts of the timbers are united, being only a continuation of floor-timbers upwards.

FLORA, the reputed goodeſs of flowers, was, according to Lactantius, only a lady of pleaſure, who having gained large ſums of money by proſtituting herſelf, made the Roman people her heir, on condition that certain games called *Floralia* might be annually celebrated on her birth-day. Some time afterwards, however, ſuch a foundation appearing unworthy the majeſty of the Roman people, the ſenate, to ennoble the ceremony, converted Flora into a goddeſs, whom they ſuppoſed to preſide over flowers; and ſo made it a part of religion to render her propitious, that it might be well with their gardens, vineyards, &c. But Voſſius (*de Idolol.* lib. i. c. 12.) can by no means allow the goddeſs Flora to have been the courtezan above mentioned: he will rather have her a Sabine deity, and thinks her worſhip might have commenced under Romulus. His reaſon is, that Varro, in his fourth book of the Latin tongue, ranks Flora among the deities to whom Tatius king of the Sabines offered up vows before he joined battle with the Romans. Add, that from another paſſage in Varro it

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Florales || Florence.

appears, that there were prieſts of Flora, with ſacrifices, &c. as early as the times of Romulus and Numa.

The goddeſs Flora was, according to the poets, the wife of Zephyrus. Her image in the temple of Caſtor and Pollux was dreſſed in a cloſe habit, and ſhe held in her hands the flowers of peaſe and beans: but the modern poets and painters have been more laviſh in ſetting off her charms, conſidering that no parts of nature offered ſuch innocent and exquiſite entertainment to the ſight and ſmell, as the beautiful variety which adorns, and the odour which embalms, the floral creation.

FLORALES LUDI, or FLORAL GAMES, in antiquity, were games held in honour of Flora, the goddeſs of flowers.—They were celebrated with ſhameful debaucheries. The moſt licentious diſcourſes were not enough, but the courteſans were called together by the ſound of a trumpet, made their appearance naked, and entertained the people with indecent ſhows and poſtures: the comedians appeared after the ſame manner on the ſtage. Val. Maximus relates, that Cato being once preſent in the theatre on this occaſion, the people were aſhamed to aſk for ſuch immodeſt repreſentations in his preſence; till Cato, appriſed of the reſervedneſs and reſpect with which he inſpired them, withdrew, that the people might not be diſappointed of their accuſtomed diverſion. There were ſeveral other ſorts of ſhows exhibited on this occaſion; and, if we may believe Suetonius in *Galba*, c. vi. and Vopiſcus in *Carinus*, theſe princes preſented elephants dancing on ropes on theſe occaſions.

The ludi florales, according to Pliny, lib. xviii. c. 29. were inſtituted by order of an oracle of the Sibyls, on the 28th of April; not in the year of Rome IDXVI. as we commonly read it in the ancient editions of that author; nor in IDXIV. as F. Hardouin has corrected it, but, as Voſſius reads it, in 513. Though they were not regularly held every year till after 580. They were chiefly held in the night-time, in the Patrician ſtreet: ſome will have it there was a circus for the purpoſe on the hill called Hortulorum.

FLORALIA, in antiquity, a general name for the feaſts, games, and other ceremonies, held in honour of the goddeſs Flora. See FLORA and FLORALES *Ludi*.

FLORENCE, the capital of the duchy of Tuſcany, and one of the fineſt cities in Italy. It is ſurrounded on all ſides but one with high hills, which riſe inſenſibly, and at laſt join with the lofty mountains called the *Apennines*. Towards Piſa, there is a vaſt plain of 40 miles in length; which is ſo filled with villages and pleaſure-houſes, that they ſeem to be a continuation of the ſuburbs of the city. Independent of the churches and palaces of Florence, moſt of which are very magnificent, the architecture of the houſes in general is in a good taſte; and the ſtreets are remarkably clean, and paved with large broad ſtones chiſeled ſo as to prevent the horſes from ſliding. The city is divided into two unequal parts by the river Arno, over which there are no leſs than four bridges in ſight of each other. That called the *Ponte della Trinità*, which is uncommonly elegant, is built entirely of white marble, and ornamented with four beautiful ſtatues repreſenting the Seaſons. The quays, the buildings on each ſide, and the bridges, render that part of Florence through which the river runs by far the fineſt. Every corner of this beautiful city is full of wonders in the arts of painting, ſtatuary, and architecture. The ſtreets, ſquares, and fronts of the palaces are adorned with a great number of ſtatues; ſome of them by the beſt modern maſters, Michael Angelo, Bandinelli, Donatello, Giovanni di Bologna, Benvenuto Cellini, and others. Some of the Florentine merchants formerly were men of vaſt wealth, and lived in a moſt magnificent manner. One of them, about the middle of the fifteenth century, built that noble fabric, which, from the name of its founder, is ſtill called the *Palazzo Pitti*. The man was ruined by the prodigious expence of this building, which was immediately purchaſed by the Medici family, and has continued ever ſince to be the reſidence of the ſovereigns. The gardens belonging to this palace are on the declivity of an eminence. On the ſummit there is a kind of fort, called *Belvedere*. From this, and from ſome of the higher walks, you have a complete view of the city of Florence, and the beauteous vale of Arno, in the middle of which it ſtands. This palace has been enlarged ſince it was purchaſed from the ruined family of Pitti. The furniture is rich and curious, particularly ſome tables of Florentine work, which are much admired. The moſt precious ornaments, however, are the paintings. The walls of what is called the *Imperial Chamber*, are painted in freſco, by various painters; the ſubjects are allegorical, and in honour of Lorenzo of Medicis diſtinguiſhed by the name of the *Magnificent*. The famous gallery attracts every ſtranger. One of the moſt intereſting parts of it, in the eyes of many, is the ſeries of Roman emperors, from Julius Cæſar to Gallienus, with a conſiderable number of their empreſſes, arranged oppoſite to them. This ſeries is almoſt complete; but wherever the buſt of an emperor is wanting, the place is filled up by that of ſome other diſtinguiſhed Roman. The celebrated Venus of Medici, which, take it all in all, is thought to be the ſtandard of taſte in female beauty and proportion, ſtands in a room called the *Tribunal*. The inſcription on its baſe mentions its being made by Cleomenes an Athenian, the ſon of Apollodorus. It is of white marble, and ſurrounded by other maſter-pieces of ſculpture, ſome of which are ſaid to be the works of Praxiteles and other Greek maſters. In the ſame room are many valuable curioſities, beſides a collection of admirable pictures by the beſt maſters. There are various other rooms, whoſe contents are indicated by the names they bear; as, the Cabinet of Arts, of Aſtronomy, of Natural Hiſtory, of Medals, of Porcelain, of Antiquities; the Saloon of the Hermaphrodite, ſo called from a ſtatue which divides the admiration of the amateurs with that in the Borgheſe village at Rome, though the excellence of the execution is diſgraced by the vileneſs of the ſubject; and the Gallery of Portraits, which contains the portraits of the moſt eminent painters (all executed by themſelves) who have flouriſhed in Europe during the three laſt centuries. Our limits will not admit of a detail of the hundredth part of the curioſities and buildings of Florence. We muſt not however omit mentioning the chapel of St Lorenzo, as being perhaps the fineſt and moſt expenſive habitation that ever was reared for the dead; it is encruſted with precious ſtones, and adorned by the workmanſhip of the beſt modern ſculptors. Mr Addiſon remarked, that

Florence.

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Florence. that this chapel advanced ſo very ſlowly, that it is not impoſſible but the family of Medicis may be extinct before their burial-place is finiſhed. This has actually taken place: the Medici family is extinct, and the chapel remains ſtill unfiniſhed.

Florence is a place of ſome ſtrength, and contains an archbiſhop's ſee and an univerſity. The number of inhabitants is calculated at 80,000. They boaſt of the improvements they have made in the Italian tongue, by means of their Academia della Cruſca; and ſeveral other academies are now eſtabliſhed at Florence. Though the Florentines affect great ſtate, yet their nobility and gentry drive a retail trade in wine, which they ſell from their cellar-windows, and ſometimes they even hang out a broken flaſk, as a ſign where it may be bought. They deal, beſides wine and fruits, in gold and ſilver ſtuffs. The Jews are not held in that degree of odium, or ſubjected to the ſame humiliating diſtinctions here, as in moſt other cities of Europe; and it is ſaid that ſome of the richeſt merchants are of that religion.

As to the manners and amuſements of the inhabitants, Dr Moore informs us, that "beſides the *converſazionis* which they have here, as in other towns of Italy, a number of the nobility meet every day at a houſe called the *Caſino*. This ſociety is pretty much on the ſame footing with the clubs in London. The members are elected by ballot. They meet at no particular hour, but go at any time that is convenient. They play at billiards, cards, and other games, or continue converſing the whole evening, as they think proper. They are ſerved with tea, coffee, lemonade, ices, or what other refreſhments they chooſe; and each perſon pays for what he calls for. There is one material difference between this and the Engliſh clubs, that women as well as men are members. The company of both ſexes behave with more frankneſs and familiarity to ſtrangers, as well as to each other, than is cuſtomary in public aſſemblies in other parts of Italy. The opera is a place where the people of quality pay and receive viſits, and converſe as freely as at the Caſino above mentioned. This occaſions a continual paſſing and repaſſing to and from the boxes, except in thoſe where there is a party of cards formed; it is then looked on as a piece of ill manners to diſturb the players. From this it may be gueſſed, that here, as in ſome other towns in Italy, little attention is paid to the muſic by the company in the boxes, except at a new opera, or during ſome favourite air. But the dancers command a general attention: as ſoon as they begin, converſation ceaſes; even the card-players lay down their cards, and fix their eyes on the *ballette*. Yet the excellence of Italian dancing ſeems to conſiſt in feats of ſtrength, and a kind of jerking agility, more than in graceful movement. There is a continual conteſt among the performers, who ſhall ſpring higheſt. You ſee here none of the ſprightly alluring gaiety of the French comic dancers, nor of the graceful attitudes and ſmooth flowing motions of the performers in the ſerious opera at Paris. It is ſurpriſing, that a people of ſuch taſte and ſenſibility as the Italians, ſhould prefer a parcel of athletic jumpers to elegant dancers. On the evenings on which there is no opera, it is uſual for the genteel company to drive to a public walk immediately without the city, where they remain till it begins to grow duſkiſh." E. Long. 12. 24. N. Lat. 43. 34.

FLORENCE, an ancient piece of Engliſh gold-coin. Florentia Florida. Every pound-weight of ſtandard-gold was to be coined into 50 Florences to be current at ſix ſhillings each; all which made in tale 15 pounds; or into a proportionate number of half-Florences or quarter-pieces, by indenture of the mint: 18 Edw. III.

FLORENTIA (anc. geog.), a town of Etruria, on the Arnus; of great note in Sylla's wars. Now called *Florenza* or *Firenza* by the Italians; *Florence* in Engliſh. E. Long. 11. Lat. 43. 30.

FLORENTINE MARBLE. See CITADANESCA.

FLORESCENTIA (from *floreſco*, "to flouriſh or bloom"); the act of flowering, which Linnæus and the ſexualiſts compare to the act of generation in animals; as the ripening of the fruit in their opinion reſembles the birth. See FLOWER.

FLORID STYLE, is that too much enriched with figures and flowers of rhetoric.

FLORIDA, the moſt ſoutherly province of the Britiſh empire in America before the laſt war, bounded on the ſouth by the Gulf of Mexico, on the north by the Apalachian mountains, on the eaſt by the province of Georgia, and on the weſt by the river Miſſiſſippi. It was firſt diſcovered, in 1497, by Sebaſtian Cabot, a Venetian, then in the Engliſh ſervice; whence a right to the country was claimed by the kings of England; and this province, as well as Georgia, were included in the charter granted by Charles II. to Carolina. In 1512, however, Florida was more fully diſcovered by Ponce de Leon, an able Spaniſh navigator, but who undertook his voyage from the moſt abſurd motives that can be well imagined.—The Indians of the Caribbee iſlands had among them a tradition, that ſomewhere on the continent there was a fountain whoſe waters had the property of reſtoring youth to all old men who taſted them. The romantic imaginations of the Spaniards were delighted with this idea. Many embarked in voyages to find out this imaginary fountain, who were never afterwards heard of. Their ſuperſtitious countrymen never imagined that theſe people had periſhed. They concluded that they did not return, only becauſe they had drunk of the immortalizing liquor, and had diſcovered a ſpot ſo delightful, that they did not chooſe to leave it.—Ponce de Leon ſet out with this extravagant view as well as others, and fully perſuaded of the exiſtence of a third world, the conqueſt of which was to immortalize his name. In the attempt to diſcover this country, he rediſcovered Florida; but returned to the place from whence he came, viſibly more advanced in years than when he ſet out.—For ſome time this country was neglected by the Spaniards, and ſome Frenchmen ſettled in it. But the new colony being neglected by the miniſtry, and Philip II. of Spain having accuſtomed himſelf to think that he was the ſole proprietor of America, fitted out a fleet at Cadiz to deſtroy them. His orders were executed with barbarity. The French entrenchments were forced, and moſt of the people killed. The priſoners were hanged on trees; with this inſcription, "Not as Frenchmen, but as Heretics."

This cruelty was ſoon after revenged by Dominic de Gourgues, a ſkilful and intrepid ſeaman of Gaſcony, an enemy to the Spaniards, and paſſionately fond of hazardous expeditions and of glory. He ſold his eſtate; built ſome ſhips; and with a ſelect band of adventurers

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Florilegium || Florinians.

like himſelf, embarked for Florida. He drove the Spaniards from all their poſts with incredible valour and activity; defeated them in every rencounter; and, by way of retaliation, hung the priſoners on trees, with this inſcription, "Not as Spaniards, but as Aſſaſſins." This expedition was attended with no other conſequences: Gourgues blew up the forts he had taken, and returned home, where no notice was taken of him. It was conquered in 1539, by the Spaniards under Ferdinand de Soto, not without a great deal of bloodſhed; as the natives were very warlike, and made a vigorous reſiſtance. The ſettlement, however, was not fully eſtabliſhed till the year 1665; when the town of St Auguſtine, the capital of the colony while it remained in the hands of the Spaniards, was founded. In 1586, this place was taken and pillaged by Sir Francis Drake. It met with the ſame fate in 1665, being taken and plundered by Captain Davis and a body of buccaneers. In 1702, an attempt was made upon it by Colonel More, governor of Carolina. He ſet out with 500 Engliſh and 700 Indians; and having reached St Auguſtine, he beſieged it for three months; at the expiration of which, the Spaniards having ſent ſome ſhips to the relief of the place, he was obliged to retire. In 1740, another attempt was made by General Oglethorpe: but he being outwitted by the Spaniſh governor, was forced to raiſe the ſiege with loſs; and Florida continued in the hands of the Spaniards till the year 1763, when it was ceded by treaty to Great Britain.—During the laſt war it was again reduced by his Catholic majeſty, and was guaranteed to the crown of Spain at the peace.

FLORILEGIUM, Florilege, a name the Latins have given to what the Greeks call ανθολογιον, *anthology*; viz. a collection of choice pieces, containing the fineſt and brighteſt things in their kind.

Florilege is alſo particularly uſed for a kind of breviary, in the Eaſtern church, compiled by Arcadius, for the conveniency of the Greek prieſts and monks, who cannot carry with them, in their travels and pilgrimages, all the volumes wherein their office is diſperſed. The florilegium contains the general rubrics, pſalter, canticles, the horologium, and the office of the feriæ, &c.

FLORIN, is ſometimes uſed for a coin, and ſometimes for a money of account.

Florin, as a coin, is of different values, according to the different metals and different countries where it is ſtruck. The gold florins are moſt of them of a very coarſe alloy, ſome of them not exceeding thirteen or fourteen carats, and none of them ſeventeen and a half. See *Money-Table*.

Florin, as a money of account, is uſed by the Italian, Dutch, and German merchants and bankers, but admits of different diviſions in different places. *Ibid.*

FLORINIANI, or Florians, a ſect of heretics, of the ſecond century, denominated from its author Florinus, or Florianus, a prieſt of the Roman church, depoſed along with Blaſtus for his errors. Florinus had been a diſciple of St Polycarp, along with Irenæus. He made God the author of evil; or rather aſſerted, that the things forbidden by God are not evil, but of his own appointing. In which he followed the errors of Valentinus, and joined himſelf with the Carpocratians. They had alſo other names given them. Philaſtrius ſays, they were the ſame with the *Carpophorians*. He adds, that they were alſo called *ſoldiers, milites, quia de militaribus fuerunt*. St Irenæus calls them *Gnoſtics*; St Epiphanius, *Phibionites*; and Theodoret, *Borborites*, on account of the impurities of their lives. Others call them *Zaccheans*; others *Goddians*, &c. though for what particular reaſons, it is not eaſy to ſay, nor perhaps would it be worth while to inquire.

Flos

FLORIS (Francis), an eminent hiſtorical painter, was born at Antwerp in 1520. He followed the profeſſion of a ſtatuary till he was twenty years of age; when preferring painting, he entered the ſchool of Lambert Lombard, whoſe manner he imitated very perfectly. He afterwards went to Italy, and completed his ſtudies from the moſt eminent maſters. The great progreſs he made in hiſtorical painting, at his return procured him much employment; and his countrymen complimented him with the flattering appellation of *the Flemiſh Raphael*. He got much money, and might have rendered his acquaintance more worthy of the attention of the great, had he not debaſed himſelf by frequent drunkenneſs. He died 1570, aged 50.

FLORIST, a perſon curious or ſkilled in flowers; their kinds, names, characters, culture, &c. It is alſo applied to an author who writes what is called the flora of any particular place, that is, a catalogue of the plants and trees which are found ſpontaneouſly growing there.

FLORUS (Lucius Annæus), a Latin hiſtorian, of the ſame family with Seneca and Lucan. He flouriſhed in the reigns of Trajan and Adrian; and wrote an Abridgment of the Roman Hiſtory, of which there have been many editions. It is compoſed in a florid and poetical ſtyle; and is rather a panegyric on many of the great actions of the Romans, than a faithful and correct recital of their hiſtory. He alſo wrote poetry, and entered the liſts againſt the emperor Adrian, who ſatirically reproached him with frequenting taverns and places of diſſipation.

FLORY, Flowry, or *Fleury*, in heraldry, a croſs that has the flowers at the end circumflex and turning down; differing from the *potence*, in as much as the latter ſtretches out more like that which is called *patee*.

FLOS, Flower, in botany. See Flower.

Fœmineus Flos, a flower which is furniſhed with the pointal or female organs of generation, but wants the ſtamina or male organ. Female flowers may be produced apart from the male, either on the ſame root or on diſtinct plants. Birch and mulberry are examples of the firſt caſe; willow and poplar of the ſecond.

Maſculus Flos, a male flower. By this name Linnæus and the ſexualiſts diſtinguiſh a flower which contains the ſtamen, reckoned by the ſexualiſts the male organ of generation; but not the ſtigma or female organ. All the plants of the claſs dioecia of Linnæus have male and female flowers upon different roots: thoſe of the claſs monœcia bear flowers of different ſexes on the ſame root. The plants, therefore, of the former are only male and female: thoſe of the latter are androgynous; that is, contain a mixture of both male and female flowers.

Flos, in chemiſtry, the moſt ſubtile part of bodies ſeparated from the more groſs parts by ſublimation in a dry form.

FLOTA, or Flotta, *fleet*; a name the Spaniards give

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Flotſon || Flour.

give particularly to the ſhips which they ſend annually from Cadiz to the port of Vera Cruz, to fetch thence the merchandizes gathered in Mexico for Spain. It conſiſts of the captains, admiral, and patach, or pinnace, which go on the king's account; and about 16 ſhips, from 400 to 1000 tons, belonging to particular perſons. They ſet out from Cadiz about the month of Auguſt, and are 18 or 20 months before they return. Thoſe ſent to fetch the commodities prepared in Peru are called *galleons*.

The name *flotilla* is given to a number of ſhips, which get before the reſt in their return, and give information of the departure and cargo of the flota and galleons.

FLOTSON, or FLOTSOM, goods that by ſhipwreck are loſt, and floating upon the ſea; which, with jetſon and lagan, are generally given to the lord admiral: but this is the caſe only where the owners of ſuch goods are not known. And here it is to be obſerved, that *jetſon* ſignifies any thing that is caſt out of a ſhip when in danger, and afterwards is beat on the ſhore by the water, notwithſtanding which the ſhip periſhes. *Lagan* is where heavy goods are thrown overboard, before the wreck of the ſhip, and ſink to the bottom of the ſea.

FLOUNDER, FLUKE, or *But*, in ichthyology. See PLEURONECTES.

Flounders may be fiſhed for all day long, either in a ſwift ſtream, or in the ſtill deep water; but beſt in the ſtream, in the months of April, May, June, and July: the moſt proper baits are all ſorts of worms, waſps, and gentles.

FLOUR, the meal of wheat-corn, finely ground and ſifted. See MEAL.

The grain itſelf is not only ſubject to be eaten by inſects in that ſtate; but, when ground into flour, it gives birth to another race of deſtroyers, who eat it unmercifully, and increaſe ſo faſt in it, that it is not long before they wholly deſtroy the ſubſtance. The fineſt flour is moſt liable to breed theſe, eſpecially when ſtale or ill prepared. In this caſe, if it be examined in a good light, it will be obſerved to be in continual motion, and on a nicer inſpection there will be found in it a great number of little animals of the colour of the flour, and very nimble. If a little of this flour is laid on the plate of the double microſcope, the inſects are very diſtinctly ſeen in great numbers, very briſk and lively, continually crawling over one another's backs, and playing a thouſand antic tricks together; whether in diverſion, or in ſearch of food, is not eaſy to be determined. Theſe animals are of an oblong and ſlender form; their heads are furniſhed with a kind of trunk or hollow tube, by means of which they take in their food, and their body is compoſed of ſeveral rings. They do vaſt miſchief among magazines of flour laid up for armies and other public uſes. When they have once taken poſſeſſion of a parcel of this valuable commodity, it is impoſſible to drive them out; and they increaſe ſo faſt, that the only method of preventing the total loſs of the parcel is to make it up into bread as ſoon as can be done. The way to prevent their breeding in the flour is to preſerve it from damp: nothing gets more injury by being put up in damp than flour; and yet nothing is more frequently put up ſo. It ſhould be always carefully and thoroughly dried before it is put up; and the barrels alſo dried into which it is to be put; then, if they are placed in a room tolerably warm and dry, they will keep it well. Too dry a place never does flour any hurt, though one too moiſt almoſt always ſpoils it. Flour.

Flour, when carefully analyſed, is found to be compoſed of three very different ſubſtances. The firſt and moſt abundant is pure *ſtarch*, or white fecule, inſoluble in cold but ſoluble in hot water, and of the nature of mucous ſubſtances; which, when diſſolved, form water-glues. The ſecond is the *gluten*, moſt of whoſe properties have been deſcribed under the article BREAD. The third is of a mild nature, perfectly ſoluble in cold water, of the nature of *ſaccharine* extractive mucous matters. It is ſuſceptible of the ſpirituous fermentation, and is found but in ſmall quantity in the flour of wheat. See BREAD, GLUTEN, STARCH, and SUGAR.

FLOWER, FLOS, among botaniſts and gardeners, the moſt beautiful part of trees and plants, containing the organs or parts of fructification. See BOTANY, p. 427—429, and explanation of Plate CIII. in p. 439, col. 1. See alſo p. 441, col. 1.

Flowers, deſigned for medicinal uſe, ſhould be plucked when they are moderately blown, and on a clear day before noon: for conſerves, roſes muſt be taken in the bud.

FLOWERS, in antiquity. We find flowers in great requeſt at the entertainments of the ancients, being provided by the maſter of the feaſt, and brought in before the ſecond courſe; or, as ſome are of opinion, at the beginning of the entertainment. They not only adorned their heads, necks, and breaſts, with flowers, but often beſtrewed the beds whereon they lay, and all parts of the room with them. But the head was chiefly regarded. See GARLAND.

Flowers were likewiſe uſed in the bedecking of tombs. See BURIAL.

Eternal FLOWER. See XERANTHEMUM.

Everlaſting FLOWER. See GNAPHALIUM.

FLOWER-Fence. See POINCIANA.

Sun-FLOWER. See HELIANTHUS.

Sultan-FLOWER. See CYANUS.

Trumpet-FLOWER. See BIGNONIA.

Wind-FLOWER. See ANEMONE.

FLOWER-de-lis, or *Flower-de-luce*, in heraldry, a bearing repreſenting the lily, called the *queen of flowers*, and the true hieroglyphic of royal majeſty; but of late it is become more common, being borne in ſome coats one, in others three, in others five, and in ſome *ſemee* or ſpread all over the eſcutcheon in great numbers.

The arms of France are, three flower-de-lis or, in a field azure.

FLOWER-de-Luce. See IRIS.

FLOWERS, in heraldry. They are much uſed in coats of arms; and in general ſignify hope, or denote human frailty and momentary proſperity.

FLOWERS, in chemiſtry. By this name are generally underſtood bodies reduced into very fine parts, either ſpontaneouſly, or by ſome operation of art; but the term is chiefly applied to volatile ſolid ſubſtances, reduced into very fine parts, or into a kind of meal by ſublimation.—Some flowers are nothing elſe than the bodies themſelves, which are ſublimed entire, without

ſuffering

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Flowers. suffering any alteration or decompoſition; and other flowers are ſome of the conſtituent parts of the body ſubjected to ſublimation.

Colours of FLOWERS. See the article *Colour (of Plants)*.

Colours extracted from FLOWERS. See *Colour-Making*, n° 35, 40.

Preſerving of FLOWERS. The method of preſerving flowers in their natural beauty through the whole year has been much ſought after by many people. Some have attempted it by gathering them when dry and not too much opened, and burying them in dry ſand; but this, though it preſerves their figure well, takes off from the livelineſs of their colour. Muntingius prefers the following method to all others. Gather roſes, or other flowers, when they are not yet thoroughly open, in the middle of a dry day: put them into a good earthen veſſel glazed within; fill the veſſel up to the top with them; and when full ſprinkle them over with ſome good French wine, with a little ſalt in it; then ſet them by in a cellar, tying down the mouth of the pot. After this they may be taken out at pleaſure; and, on ſetting them in the ſun, or within reach of the fire, they will open as if growing naturally; and not only the colour, but the ſmell alſo will be preſerved.

The flowers of plants are by much the moſt difficult parts of them to preſerve in any tolerable degree of perfection; of which we have inſtances in all the collections of dried plants, or *horti ſicci*. In theſe the leaves, ſtalks, roots, and ſeeds of the plants appear very well preſerved; the ſtrong texture of theſe parts making them always retain their natural form, and the colours in many ſpecies naturally remaining. But where theſe fade, the plant is little the worſe for uſe as to the knowing the ſpecies by it. But it is very much otherwiſe in regard to flowers: theſe are naturally by much the moſt beautiful parts of the plants to which they belong; but they are ſo much injured in the common way of drying, that they not only loſe, but change their colours one into another, by which means they give a handle to many errors; and they uſually alſo wither up, ſo as to loſe their very form and natural ſhape. The primroſe and cowſlip kinds are very eminent inſtances of the change of colours in the flowers of dried ſpecimens: for thoſe of this claſs of plants eaſily dry in their natural ſhape; but they loſe their yellow, and, inſtead of it, acquire a fine green colour, much ſuperior to that of the leaves in their moſt perfect ſtate. The flowers of all the violet kind loſe their beautiful blue, and become of a dead white: ſo that in dried ſpecimens there is no difference between the blue-flowered violet and the white-flowered kinds.

Sir Robert Southwell has communicated to the world a method of drying plants, by which this defect is propoſed to be in a great meaſure remedied, and all flowers preſerved in their natural ſhape, and many in their natural colours.—For this purpoſe two plates of iron are to be prepared of the ſize of a large half-ſheet of paper, or larger, for particular occaſions: theſe plates muſt be made ſo thick as not to be apt to bend; and there muſt be a hole made near every corner for the receiving a ſcrew to faſten them cloſe together. When theſe plates are prepared, lay in readineſs ſeveral ſheets of paper, and then gather the plants with their flowers when they are quite perfect. Let this be always done in the middle of a dry day; and then lay the plant and its flower on one of the ſheets of paper doubled in half, ſpreading out all the leaves and petals as nicely as poſſible. If the ſtalk is thick, it muſt be pared or cut in half, ſo that it may lie flat; and if it is woody, it may be peeled, and only the bark left. When the plant is thus expanded, lay round about it ſome looſe leaves and petals of the flower, which may ſerve to complete any part that is deficient. When all is thus prepared, lay ſeveral ſheets of paper over the plant, and as many under it; then put the whole between the iron plates, laying the papers ſmoothly on one, and laying the other evenly over them: ſcrew them cloſe, and put them into an oven after the bread is drawn, and let them lie there two hours. After that, make a mixture of equal parts of aquafortis and common brandy; ſhake theſe well together, and when the flowers are taken out of the preſſure of the plates, rub them lightly over with a camel's-hair pencil dipped in this liquor; then lay them upon freſh brown paper, and covering them with ſome other ſheets, preſs them between this and other papers with a handkerchief till the wet of theſe liquors is dried wholly away. When the plant is thus far prepared, take the bulk of a nutmeg of gum-dragon; put this into a pint of fair water cold, and let it ſtand 24 hours; it will in this time be wholly diſſolved: then dip a fine hair-pencil in this liquor, and with it daub over the back ſides of the leaves, and lay them carefully down on a half-ſheet of white paper fairly expanded, and preſs them down with ſome more papers over theſe. When the gum-water is fixed, let the preſſure and papers be removed, and the whole work is finiſhed. The leaves retain their verdure in this caſe, and the flowers uſually keep their natural colours. Some care, however, muſt be taken, that the heat of the oven be not too great. When the flowers are thick and bulky, ſome art may be uſed to pare off their backs, and diſpoſe the petals in a due order; and after this, if any of them are wanting, their places may be ſupplied with ſome of the ſupernumerary ones dried on purpoſe; and if any of them are only faded, it will be prudent to take them away, and lay down others in their ſtead: the leaves may be alſo diſpoſed and mended in the ſame manner. Flowers.

Another method of preſerving both flowers and fruit found throughout the whole year is alſo given by the ſame author. Take ſaltpetre one pound; armenian bole, two pounds; clean common ſand, three pounds. Mix all well together; then gather fruit of any kind that is not fully ripe, with the ſtalk to each; put theſe in, one by one, into a wide-mouthed glaſs, laying them in good order. Tie over the top with an oil-cloth, and carry them into a dry cellar, and ſet the whole upon a bed of the prepared matter of four inches thick in a box. Fill up the remainder of the box with the ſame preparation; and let it be four inches thick all over the top of the glaſs, and all round its ſides. Flowers are to be preſerved in the ſame ſort of glaſſes, and in the ſame manner; and they may be taken up after a whole year as plump and fair as when they were buried.

FLOWERS (artificial) of the Chineſe. See TONG-TSAO.

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Flowers, Flowering

FLOWERS, in chemiſtry, are the fineſt and moſt ſubtle parts of dry bodies, raiſed by fire, into the veſſel's head and aludels; and adhering to them in form of a fine powder or duſt. Such are the flowers of ſulphur, benjamin, &c.

FLOWERS, in the animal economy, denote womens monthly purgations or menſes.—Nicod derives the word in this ſenſe from *fluere*, q. d. *fluors*. Others will have the name occaſioned hence, that women do not conceive till they have had their flowers; ſo that theſe are a ſort of forerunners of their fruit.

FLOWERS, in rhetoric, are figures or ornaments of diſcourſe, by the Latins called *floſculi*.

FLOWERING *of Bulbous* PLANTS. Theſe plants will grow and flower in water alone, without any earth, and make a very elegant appearance. We daily ſee this practiſed in ſingle roots; but there is a method of doing it with ſeveral roots in the ſame veſſel. Take a common ſmall garden-pot; ſtop the hole at the bottom with a cork, and lute in the cork with putty, that no water can get through; then fit a board to the top of the pot, and bore ſix or ſeven holes in it at equal diſtances, to place the bulbs in; and as many ſmaller ones near them to receive ſticks, which will ſerve to tie up the flowers. Then fill up the pot with water to the board; and place tulips, jonquils, narciſſus's, and the like plants in the root upon the holes, ſo that the bottom of the roots may touch the water: thus will they all flower early in the ſeaſon, and be much more beautiful than any pot of gathered flowers, and will laſt many weeks in their full perfection. After the ſeaſon of flowering is over, the roots will gradually ſhrink through the holes of the board, and get looſe into the water: but, inſtead of being ſpoiled there, they will ſoon increaſe in ſize; ſo that they cannot return through the holes, and will produce ſeveral off-ſets. It is natural to try from this the conſequence of keeping the roots under water during the whole time of their blowing; and in this way they have been found to ſucceed very well, and flower even ſtronger and more beautifully than when in the ground. They may thus, alſo, with proper care in the degree of heat in the room, be kept flowering from before Chriſtmas till March or April. It is not eaſy, in this laſt manner, to manage the keeping the boards under water, for which reaſon, it is better to procure ſome ſheet-lead of about four pounds to the foot, and cut this to the ſize of the mouth of the pot. In this there ſhould be bored holes for the bulbs, and other holes for the ſticks: and, in order to keep the ſticks quite firm, it is proper to have another plate of lead ſhaped to the bottom of the pot, with holes in it, anſwering to thoſe of the upper plate made for the ſticks. The ſticks will by this means be always kept perfectly ſteady; and the roots, being kept under water by the upper plate of lead, will flower in the moſt vigorous and beautiful manner imaginable.—Some have thought of adding to the virtues of the water by putting in nitre in ſmall quantities, and others have added earth and ſand at the bottom; but it has always been found to ſucceed better without any addition.

It may be more agreeable to ſome to uſe glaſs-jars in this laſt method with the leads, inſtead of earthen pots. The bulbs ſucceed full as well as theſe; and there is this advantage, that the progreſs of the roots is ſeen all the while, and they are managed better as to the ſupply of water. Flowering.

By repeated experiments in this way on dried bulbs, and on thoſe taken freſh out of the ground, the former have been found to ſucceed the beſt. For thoſe taken freſh out of the ground being full of moiſture, will not ſo ſoon, upon changing their element, be nouriſhed fully by a new one; and the fibres which they had ſtruck in the ground, always rot when put into the water, and new ones muſt be formed in their places; ſo that it requires more time for them to come to flowering. The bulbs themſelves will not rot in this manner; but they will never be ſo ſtrong as thoſe which were put into the water dry, which gradually fill themſelves with moiſture from it, and regularly plump up. The beſt method of managing the whole proceſs is this: Place the bulbs at firſt only on the ſurface of the water; for thus they will ſtrike out their fibres moſt ſtrongly. When they have ſtood thus ſix weeks, pour in the water ſo high as to cover them entirely, and keep them thus till they have done flowering.

Sometimes the roots will become mouldy in ſeveral parts while they ſtand above the water, and the cleaning them of it is to no purpoſe; for it will eat and ſpread the farther, and frequently eat through two or three of their coats. In this caſe they muſt be immediately covered with water; when the mould will be ſtopped, and the roots become ſound, and flower as well as thoſe which never had any ſuch diſtemper. If the roots are ſuffered to remain in water all the year, they will not decay; but will flower again at their proper ſeaſon, and that as vigorouſly as thoſe which have been taken out and dried. The old fibres of thoſe roots never rot till they are ready to puſh forth new ones. It is found by experience, that the hyacinth, and many other plants, grow to a greater degree of perfection when thus in water than when in the ground. There is a peculiar ſpecies of hyacinth called *Keyſer's jewel*; this never, or very rarely, produces ſeed-veſſels in the common way of flowering in the ground; but it will often produce ſome pods when blown in water.

Mr Millar has intimated, in the Philoſophical Tranſactions, that bulbs ſet in glaſſes grow weaker, and ſhould be renewed every other year: but it is found, that, when managed in this manner, and kept under water, at the time of taking them up, they are as large, and ſome of them larger, than when planted; and if theſe be dried at a proper ſeaſon, they will flower, year after year, as well as freſh ones.

Ranunculus and anemone roots have been found to ſhoot up their ſtalks very well in this way; but the flowers are uſually blaſted, which ſeems to ariſe from want of free air. Pinks will flower very well in this manner; auriculas alſo may, with care, be brought to flower, but not ſtrongly. Roſes, jeſſamines, and honeyſuckles, may alſo be made to flower this way, and will thrive and ſend out ſuckers; the beſt pieces to plant, are ſuckers cut off about three inches under ground, without any fibres. The ſucculent plants may alſo be raiſed this way; for inſtance, the opuntia or Indian fig. If a fragment of a leaf of this plant be cut, and laid by to dry for a month till it is an abſolute ſkin, as ſoon as it is put in this manner into water, it be-

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Flowering. gins to plump up, and ſoon ſends out fibrous roots, and produces new leaves as quickly as it would do in the ground.

This is the more ſingular in theſe ſort of plants, becauſe in their natural ſtate in the ground, they cannot bear much water. This method of growing in water is not peculiar to the bulbous-rooted ones, but others may even be raiſed from ſeed by it. A bean or pea, ſet in this manner, will grow up to its proper ſtandard, and will flower and produce pods which will ripen their ſeed. The ſmaller ſeeds may be alſo raiſed in this manner, by the help of wool to ſupport them.

No vegetable tranſplanted out of the earth into water will thrive kindly; but any plant, whether raiſed from the root or ſeed in water, may be tranſplanted to the earth, and will ſucceed very well. It may be poſſible, therefore, from this method of raiſing plants in water, to come at a better way than is uſually practiſed of raiſing ſome roots in the earth which are ſubject to rot there; ſuch as anemonies, ranunculus's, and hyacinths. A bulb dropped by chance upon the ground, will ſtrike out both ſtronger and more numerous fibres than thoſe which are planted in the uſual way in the ground. On this principle, it may be proper to take out the earth of the bed where the bulbs are to ſtand at the time of planting them, to ſuch a depth as they are to be placed under it when ſet for flowering. The bulbs are then to be ſet in their places, on the ſurface of this low ground; and to ſtand there till they have ſhot out their fibres and their head: then the earth is to be added over them by degrees, till they are covered as high above the head as they are in the uſual manner of planting them: thus they would be preſerved from the danger of rotting; and their fibres would be much ſtronger, and conſequently they would draw more nouriſhment, and flower better, than in the common way. The common method of planting theſe roots renders them liable to be deſtroyed by either extreme of a wet or a dry ſeaſon. In the firſt caſe, they immediately rot by the abundant moiſture they receive; and, in the ſecond, they become dry as a ſtick, and mouldy; ſo that they are infallibly rotted by the firſt rain that falls afterwards.

The directions neceſſary to the ſucceſs of the bulbs planted in water are theſe. When the leaden falſe bottoms are fixed down tight within two or three inches of the bottom of the veſſel (which is only deſigned to hold the ſticks ſteady which are to ſupport the leaves and ſtalks), then lay on the lead upon which the bulbs are to reſt, placing the notched part oppoſite to that in the falſe bottom, as near as the ſticks, when placed, will ſuffer it; then place the bulbs one in each hole, and fill up with water to the upper lead. The bottom of the bulb will then touch the water; and as the water diminiſhes in quantity, keep it ſupplied with more up to the ſame height for a month or ſix weeks; in which time the bulbs will have ſhort ſtrong fibres. Then fill up the water about half an inch above the ſurface of the lead; and, by degrees, as the fibres ſtrengthen, and the plume ſhoots from the head, keep the water higher and higher, till at length the whole bulb is covered. The water is to be kept at this ſtandard till the ſeaſon for drying them returns.—At the time of planting the bulbs, they muſt be carefully cleaned from any foulneſſes at the bottom, by ſcraping them with the point of a knife till the ſound part of the bulb appears; clear them likewiſe from any looſe ſkins, and even take off their brown ſkin till they appear white; otherwiſe this brown ſkin will tinge the water, and the growth will not ſucceed ſo well. Flowering || Fluid.

The notches in the ſide of each lead are intended to give eaſy paſſage to the water, that, if there ſhould be any foulneſs or ſediment in it, on ſhaking it a little it may all run through, and freſh water be put in its place. But this ſhifting the water need not be done more than once or twice in a winter, as there may be occaſion from the foulneſs; and when this is done, the ſides of the veſſel ſhould be cleaned with a painter's bruſh, and rinſed out again, and the bulbs themſelves waſhed, by pouring water on them at a little diſtance.

At any time when the outer ſkins of the bulbs dry, they are to be peeled off, that they may not occaſion foulneſs in the water; and if any duſt or foul matter be at any time obſerved ſwimming on the ſurface, the method is to fill up the pot or veſſel to the rim, and let it run over: this will carry off that light foulneſs, and the water may afterwards be poured away to the proper ſtandard.

Bulbs of equal bigneſs ſhould be planted together in the ſame pot, that they may all have the ſame benefit of the water. Narciſſus's and hyacinths do well together; as alſo tulips and jonquils, and crocuſes and ſnow-drops.

FLUDD (Robert), a famous philoſopher, born in 1574. He was fellow of the college of phyſicians in London, and became a moſt voluminous writer: he doated greatly on the wonders of chemiſtry; was a zealous brother of the Roſicrucian order; and his books, which are moſtly in Latin, are as dark and myſterious in their language as in their matter. He died in 1637.

FLUID, an appellation given to all bodies whoſe particles eaſily yield to the leaſt partial preſſure, or force impreſſed. For the

Laws and Properties of FLUIDS. See HYDROSTATICS.

There are various kinds of animalcules to be diſcerned in different fluids by the microſcope. Of many remarkable kinds of theſe, a deſcription is given under the article ANIMALCULE. All of theſe little creatures are eaſily deſtroyed by ſeparating them from their natural element. Naturaliſts have even fallen upon ſhorter methods. A needle-point, dipped in ſpirit of vitriol, and then immerſed into a drop of pepper-water, readily kills all the animalcules; which, though before friſking about with great livelineſs and activity, no ſooner come within the influence of the acid particles, than they ſpread themſelves, and tumble down to all appearance dead. The like may be done by a ſolution of ſalt; only with this difference, that, by the latter application, they ſeem to grow vertigiaous, turning round and round till they fall down. Tincture of ſalt of tartar, uſed in the ſame manner, kills them ſtill more readily; yet not ſo, but there will be apparent marks of their being firſt ſick and convulſed. Inks deſtroy them as faſt as ſpirit of vitriol, and human blood produces the ſame effect. Urine, ſack, and ſugar, all deſtroy them, though not ſo faſt; beſides, that there is

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Fluid. some diverſity in their figures and appearances, as they receive their deaths from this poiſon or that. The point of a pin dipped in ſpittle, preſently killed all the kinds of animalcules in puddle-water, as Mr Harris ſuppoſes it will other animalcules of this kind.

All who are acquainted with microſcopic obſervations, know very well, that in winter, in which the beſt glaſſes can diſcover no particle of animated matter, after a few grains of pepper, or a fragment of a plant of almoſt any kind, has been ſome time in it, animals full of life and motion are produced; and thoſe in ſuch numbers, as to equal the fluid itſelf in quantity.—When we ſee a numerous brood of young fiſhes in a pond, we make no doubt of their having owed their origin to the ſpawn, that is, to the eggs of the parents of the ſame ſpecies. What are we then to think of theſe? If we will conſider the progreſs of nature in the inſect tribes in general, and eſpecially in ſuch of them as are moſt analogous to theſe, we ſhall find it leſs difficult to give an account of their origin than might have been imagined.

A ſmall quantity of water taken from any ditch in the ſummer-months, is found to be full of little worms, ſeeming in nothing ſo much as in ſize to differ from the microſcopic animalcules. Nay, water, without theſe, expoſed in open veſſels to the heat of the weather, will be always found to abound with multitudes of them, viſible to the naked eye, and full of life and motion. Theſe we know, by their future changes, are the fly-worms of the different ſpecies of gnats, and multitudes of other fly-ſpecies; and we can eaſily determine, that they have owed their origin only to the eggs of the parent-fly there depoſited. Nay, a cloſer obſervation will at any time give ocular proof of this; as the flies may be ſeen laying their eggs there, and the eggs may be followed through all their changes to the fly again. Why then are we to doubt but that the air abounds with other flies and animalcules as minute as the worms in thoſe fluids; and that theſe laſt are only the fly-worms of the former, which, after a proper time ſpent in that ſtate, will ſuffer changes like thoſe of the larger kinds, and become flies like thoſe to whoſe eggs they owed their origin? *Vid. Reaumur. Hiſt. Inſect.* vol. iv. p. 431.

The differently medicated liquors made by infuſions of different plants, afford a proper matter for the worms of different ſpecies of theſe ſmall flies: and there is no reaſon to doubt, but that among theſe ſome are viviparous, others oviparous; and to this may be, in a great meaſure, owing the different time taken up for the production of theſe inſects in different fluids. Thoſe which are a proper matter for the worms of the viviparous fly, may be ſooneſt found full of them; as, probably, the liquor is no ſooner in a ſtate to afford them proper nouriſhment, than their parents place them there: whereas thoſe produced from the eggs of the little oviparous flies, muſt, after the liquor is in a proper ſtate, and they are depoſited in it in the form of eggs, have a proper time to be hatched, before they can appear alive.

It is eaſy to prove, that the animals we find in theſe vegetable infuſions were brought thither from elſewhere. It is not leſs eaſy to prove, that they could not be in the matter infuſed any more than in the water in which it is infuſed.

Notwithſtanding the fabulous accounts of ſalamanders, it is now well known, that no animal, large or ſmall, can bear the force of fire for any conſiderable time; and, by parity of reaſon, we are not to believe, that any inſect, or embryo inſect, in any ſtate, can bear the heat of boiling water for many minutes. To proceed to inquiries on this foundation: If ſeveral tubes filled with water, with a ſmall quantity of vegetable matter, ſuch as pepper, oak-bark, truffles, &c. in which, after a time, inſects will be diſcovered by the microſcope; and other like tubes be filled with ſimple water boiled, with water and pepper boiled together, and with water with the two other ingredients, all ſeparately boiled in it; when all theſe liquors come to a proper time for the obſervation of the microſcope, all, as well thoſe which have been boiled as thoſe which have not, will be found equally to abound with inſects; and thoſe of the ſame kind, in infuſions of the ſame kind, whether boiled or not boiled. Thoſe in the infuſions which had ſuſtained a heat capable of deſtroying animal-life, muſt therefore not have ſubſiſted either in the water or in the matters put into it, but muſt have been brought thither after the boiling; and it ſeems by no way ſo probably, as by means of ſome little winged inhabitants of the air depoſiting their eggs or worms in theſe fluids.

On this it is natural to aſk, how it comes to paſs, that while we ſee myriads of the progeny of theſe winged inſects in water, we never ſee themſelves? The anſwer is equally eaſy, viz. becauſe we can always place a drop of this water immediately before the focus of the microſcope, and keep it there while we are at leiſure to examine its contents; but that is not the caſe with regard to the air inhabited by the parent flies of theſe worms, which is an immenſe extent in proportion to the water proper for nouriſhing theſe worms; and, conſequently, while the latter are cluſtered together in heaps, the former may be diſperſed and ſcattered. Nor do we want inſtances of this, even in inſects of a larger kind. In many of our gardens, we frequently find veſſels of water filled with worms of the gnat kind, as plentifully, in proportion to their ſize, as thoſe of other fluids are with animalcules. Every cubic inch of water in theſe veſſels contains many hundreds of animals; yet we ſee many cubic inches of air in the garden not affording one of the parent flies.

But neither are we poſitively to declare that the parent flies of theſe animalcules are in all ſtates wholly inviſible to us; if not ſingly to be ſeen, there are ſome ſtrong reaſons to imagine that they may in great cluſters. Every one has ſeen in a clear day, when looking ſtedfaſtly at the ſky, that the air is in many places diſturbed by motions and convolutions in certain ſpots. Theſe cannot be the effects of imagination, or of faults in our eyes, becauſe they appear the ſame to all; and if we conſider what would be the caſe to an eye formed in ſuch a manner as to ſee nothing ſmaller than an ox, on viewing the air on a marſh fully peopled with gnats, we muſt be ſenſible, that the clouds of theſe inſects, though to us diſtinctly enough viſible, would appear to ſuch an eye merely as the moving parcels of air in the former inſtance do to us: and ſurely it is thence no raſh concluſion to infer, that the caſe may be the ſame, and that myriads of flying in-

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Fluid, Fluidity.

fects, too small to be singly the objects of our view, yet are to us what the clouds of gnats would be in the former case.

Nervous Fluid. See Anatomy, p. 761. col. 2.

Elastic Fluids. See Aerology, Air, *Fixed Air*, Gas, Vapour, &c.

FLUIDITY, is by Sir Isaac Newton defined to be, that property of bodies by which they yield to any force impressed, and which have their parts very easily moved among one another.

To this definition some have added, that the parts of a fluid are in a continual motion. This opinion is supported by the solution of salts, and the formation of tinctures. If a small bit of saffron is thrown into a phial full of water, a yellow tincture will soon be communicated to the water to a considerable height, though the phial is allowed to remain at rest; which indicates a motion in those parts of the fluid which touch the saffron, by which its colouring matter is carried up.

With regard to water, this can scarce be denied; the constant exhalations from its surface show, that there must be a perpetual motion in its parts from the ascent of the steam through it. In mercury, where insensible evaporation does not take place, it might be doubted; and accordingly the Newtonian philosophers in general have been of opinion, that there are some substances essentially fluid, from the spherical figure of their constituent particles. The congelation of mercury, however, by an extreme degree of cold *, demonstrates that fluidity is not essentially inherent in mercury more than in other bodies.

* See *Congelation.*

That fluids have vacuities in their substance is evident, because they may be made to dissolve certain bodies without sensibly increasing their bulk. For example, water will dissolve a certain quantity of salt; after which it will receive a little sugar, and after that a little alum, without increasing its first dimensions. Here we can scarce suppose any thing else than that the saline particles were interposed between those of the fluid; and as, by the mixture of salt and water, a considerable degree of cold is produced, we may thence easily see why the fluid receives these substances without any increase of bulk. All substances are expanded by heat, and reduced into less dimensions by cold; therefore, if any substance is added to a fluid, which tends to make it cold, the expansion by the bulk of the substance added, will not be so much perceived as if this effect had not happened; and if the quantity added be small, the fluid will contract as much, perhaps more, from the cold produced by the mixture, than it will be expanded from the bulk of the salt. This also may let us know with what these interstices between the particles of the fluid were filled up; namely, the element of fire or heat. The saline particles, upon their solution in the fluid, have occupied these spaces; and now the liquor, being deprived of a quantity of this element equal in bulk to the salt added, feels sensibly colder.

As, therefore, there is scarce any body to be found, but what may become solid by a sufficient degree of cold, and none but what a certain degree of heat will render fluid; the opinion naturally arises, that fire is the cause of fluidity in all bodies, and that this element is the only essentially fluid substance in nature. Hence we may conclude, that those substances which we call *fluids* are not essentially so, but only assume that appearance in consequence of an intimate union with the element of fire; just as gums assume a fluid appearance on being dissolved in spirit of wine, or salts in water. Fluidity ‖ Flumen.erg.

Upon these principles Dr Black mentions fluidity as an effect of heat *. The different degrees of heat which are required to bring different bodies into a state of fluidity, he supposes to depend on some particulars in the mixture and composition of the bodies themselves: which becomes extremely probable, from considering that we change the natural state of bodies in this respect, by certain mixtures; thus, if two metals are compounded, the mixture is usually more fusible than either of them separately. See Chemistry, n° 542.

* See *Chemistry*, n° 115, 117, 119.

It is certain, however, that water becomes warmer by being converted into ice †; which may seem contradictory to this opinion. To this, however, the Doctor replies, that fluidity does not consist in the degree of sensible heat contained in bodies, which will affect the hand or a thermometer; but in a certain quantity which remains in a latent state ‡. This opinion he supports from the great length of time required to melt ice; and to ascertain the degree of heat requisite to keep water in a fluid state, he put five ounces of water into a Florence flask, and converted it into ice by means of a freezing mixture put round the flask. Into another flask of the same kind he put an equal quantity of water cooled down nearly to the freezing point, by mixing it with snow, and then pouring it off. In this he placed a very delicate thermometer; and found, that it acquired heat from the air of the room in which it was placed: seven degrees of heat were gained the first half hour. The ice being exposed to the same degree of heat, namely, the air of a large room without fire, it cannot be doubted that it received heat from the air as fast as the water which was not frozen: but, to prevent all possibility of deception, he put his hand under the flask containing the ice, and found a stream of cold air very sensibly descending from it, even at a considerable distance from the flask; which undeniably proved, that the ice was all that time absorbing heat from the air. Nevertheless, it was not till 11 hours that the ice was half-melted, though in that time it had absorbed so much heat as ought to have raised the thermometer to 140°; and even after it was melted, the temperature of the water was found scarce above the freezing point: so that, as the heat which entered could not be found in the melted ice, he concluded that it remained concealed in the water, as an essential ingredient of its composition. See Congelation.

† See *Congelation.*

‡ See *Evaporation.*

FLUKE, or Flounder, in ichthyology. See Pleuronectes.

Fluke-Worm. See Fasciola.

Fluke of an Anchor, that part of it which fastens in the ground. See Anchor.

FLUMMERY, a wholesome sort of jelly made of oat-meal.

The manner of preparing it is as follows. Put three large handfuls of finely ground oat-meal to steep, for 24 hours, in two quarts of fair water: then pour off the clear water, and put two quarts of fresh water to it:

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Fluor. it: ſtrain it through a fine hair-ſieve, putting in two ſpoonfuls of orange-flower water and a ſpoonful of ſugar: boil it till it is as thick as a haſty-pudding, ſtirring it continually while it is boiling, that it may be very ſmooth.

FLUOR, in phyſics, a fluid; or, more properly, the ſtate of a body that was before hard or ſolid, but is now reduced by fuſion or fire into a ſtate of fluidity.

Fluor Acid. See CHEMISTRY-*Index*.

Fluor Albus. See MEDICINE-*Index*.

Fluor-Spar, or *Blue-John*, called alſo fluxing ſpars, vitreſcent or glaſs ſpars, are a genus of foſſils compoſed of calcareous earth united with an acid of a peculiar kind, of which an account is given under CHEMISTRY; ſee that article, per Index at *Fluor acid*.

They are little harder than common calcareous ſpars, and do not ſtrike fire with ſteel; nor do they efferveſce with acids either before or after calcination. When expoſed to a ſtrong fire, they crack and ſplit in pieces, but do not melt without a violent heat. Engenſtroom informs us, that all of them which he tried melted pretty eaſily before the blow-pipe; but he was obliged to take great care to prevent them from flying away before they were thoroughly heated. Their ſpecific gravity is from 3144 to 3175. Notwithſtanding the difficulty with which they are fuſed by themſelves, however, they melt very readily in conjunction with other earths; running into a corroſive glaſs which diſſolves the ſtrongeſt crucibles, unleſs ſome quartz or fire-clay be mixed in their compoſition. When gradually heated, they give a phoſphoreſcent light; but loſe this property when made red-hot. Thoſe which are coloured, particularly the green ones, give the ſtrongeſt light. They melt eaſily with borax, and next to that with the microcoſmic ſalt, neither of them making any efferveſcence. They diſſolve in acids when boiling, particularly aqua-regia; and the ſolutions are precipitated by an alkali even though cold, but not ſo completely. M. Magellan informs us, that he has frequently diſſolved them in boiling vitriolic acid in order to get that of fluor in an aerial ſtate. There are three ſpecies.

1. The indurated fluor is ſolid, and of an indeterminate figure, of a dull texture, ſemitranſparent, and full of cracks in the rock. It is of a white colour.

2. Sparry fluor. This has nearly the figure of ſpar; though, on cloſe obſervation, it is found leſs regular; nothing but its gloſſy ſurface giving it the reſemblance of ſpar. It is found of various colours, viz. white, blue, green, pale-green, violet, and yellow.

3. The cryſtallized fluor is of four kinds. 1. Having an irregular figure, of a white, blue, or red colour. 2. Cryſtallized in cubes, of a yellow or violet colour. 3. Of a polygonal ſpherical figure, white or blue coloured. 4. Of an octoedral figure, clear and colourleſs.

The principal uſe of fluors is for ſmelting ores, where they act as very powerful fluxes, and on this account are much valued. They are found in various countries, particularly Sweden, and ſome other northern countries of Europe. From this quality of melting eaſily in combination with other earthy matters, they have got the name of *fluors*. "The reſemblance between the coloured fluors and the compoſitions made of coloured glaſs (ſays Cronſtedt), has perhaps contributed not only to the fluors being reckoned of the ſame value with the coloured quartz cryſtals, by ſuch collectors as only mind colour and figure, but to their alſo obtaining a rank among the precious ſtones in the apothecaries and druggiſts ſhops." M. Fabroni obſerves, that this combination of calcareous earth with the ſparry acid is almoſt always tranſparent: it often cryſtallizes in regular cubes, ſometimes ſingle from one line to two inches in diameter, and ſometimes of an indeterminate figure. They are ſometimes of a blue colour; others are purple like amethyſts; ſome are of a brown colour, others opaque. M. Magellan ſays, that fluors in general have this ſingular property, that on being melted by the flame of the blow-pipe, together with gypſum, the lead reſulting from both is all formed with facets on the outſide; but if melted with terra ponderoſa, its ſurface is quite round or ſpherical.

Fluor || Flute.

M. Margraaf has made experiments in order to diſcover the nature of theſe ſtones. He aſcertained the above-mentioned diſtinctions between them and the gypſeous ſpars; and therefore infers, that they are not compounded of vitriolic acid with calcareous earth. He obſerved ſingular appearances on mixing them with vitriolic and other acids, and ſubjecting the mixtures to diſtillation.

Eight ounces of the powder of a green fluor being mixed with an equal weight of pure oil of vitriol, and diſtilled together with a graduated heat, yielded, after the watery part of the acid had paſſed, a fine white ſublimate, which aroſe and adhered to the neck of the retort, and even paſſed into the receiver. The firſt parts of this ſublimate which aroſe appeared like butter of antimony; and, like this butter, they melted by the heat of a live coal brought near the neck of the retort: but the parts which aroſe towards the end of the operation, with the greateſt degree of heat, could not be melted by that heat. The retort being broken, a reſiduum was found weighing 12 oz. Hence 4 oz. of oil of vitriol remained united with the ſpar. The bottom of the retort was obſerved to be pierced with holes. Laſtly, the liquor which had paſſed into the receiver and the white ſublimate, had very ſenſibly a ſulphureous ſmell. The ſublimate, triturated a long time in a mortar with hot diſtilled water, diſſolved, and paſſed thro' a filter. To the filtrated liquor ſome fixed alkali being added, a precipitate was formed; which being well waſhed and dried, was readily melted by fire into a maſs reſembling porcelain. The ſame excellent and accurate chemiſt produced the ſame effects upon this ſtone, by ſubſtituting, inſtead of the vitriolic acid, the nitrous, marine, phoſphoric, or the concentrated acetous acids.

Fluor Albus or *Uterinus*, in medicine, a kind of flux incident to women, popularly called the *whites*. See MEDICINE-*Index*.

FLUSHING, an handſome, ſtrong, and conſiderable town of the United Provinces, in Zealand, and in the iſland of Walcheren, with a very good harbour, and a great foreign trade. It was put into the hands of queen Elizabeth for a pledge of their fidelity, and as a ſecurity for the money ſhe advanced. It is one of the three places which Charles V. adviſed Philip II. to preſerve with care. E. Long. 3. 32. N. Lat. 51. 26.

FLUTE, an inſtrument of muſic, the ſimpleſt of all thoſe of the wind kind. It is played on by blowing it

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Flute. it with the mouth; and the tones or notes are changed by ſtopping and opening the holes diſpoſed for that purpoſe along its ſide.

This is a very ancient inſtrument. It was at firſt called the flute *à bec*, from *bec* an old Gauliſh word ſignifying the beak of a bird or fowl, but more eſpecially of a cock; the term *flute à bec* muſt therefore ſignify the *beaked flute*; which appears very proper, on comparing it with the traverſe or German flute. The word *flute* is derived from *fluta*, the Latin for a lamprey or ſmall eel taken in the Sicilian ſeas, having ſeven holes immediately below the gills on each ſide, the preciſe number of thoſe in the front of the flute.

By Merſennus this inſtrument is called the *fiſtula dulcis, ſeu Anglica*; the loweſt note, according to him, for the treble flute, is *C ſa ut*, and the compaſs of the inſtrument 15 notes. There is, however, a flute known by the name of the *concert flute*, the loweſt note of which is F. Indeed, ever ſince the introduction of the flute into concerts, the loweſt note of the inſtrument, of what ſize ſoever it is, has been called F; when in truth its pitch is determinable only by its correſpondence in reſpect of acuteneſs or gravity with one or other of the chords in the *ſcala maxima* or great ſyſtem.

Beſides the true concert-flute, others of a leſs ſize were ſoon introduced into concerts of violins; in which caſe the method was to write the flute-part in a key correſpondent to its pitch. This practice was introduced in 1710 by one Woodcock, a celebrated performer on this inſtrument, and William Babell organiſt of the church of All-hallows, Bread Street, London. They failed, however, in procuring for the flute a reception into concerts of various inſtruments; for which reaſon, one Thomas Staneſby, a very curious maker of flutes and other inſtruments of the like kind, about the year 1732, adverting to the ſcale of Merſennus, in which the loweſt note was C, invented what he called the *new ſyſtem*; in which, by making the flute of ſuch a ſize as to be a fifth above concert pitch, the loweſt note became *C ſol fa ut*. By this contrivance the neceſſity of tranſpoſing the flute-part was taken away; for a flute of this ſize, adjuſted to the ſyſtem above mentioned, became an octave to the violin. To further this invention of Staneſby, one Lewis Merci, an excellent performer on the flute, publiſhed, about the year 1735, ſix ſolos for this inſtrument, three of which are ſaid to be accommodated to Mr Staneſby's new ſyſtem; but the German flute was now become a favourite inſtrument, and Staneſby's ingenuity failed of its effect.—One great objection indeed lies againſt this inſtrument, which, however, equally affects all perforated pipes; namely, that they are never perfectly in tune, or cannot be made to play all their notes with equal exactneſs. The utmoſt that the makers of them can do is to tune them to ſome one key; as the hautboy to C, the German flute to D, and the Engliſh flute to F; and to effect this truly is a matter of no ſmall difficulty. The Engliſh flutes made by the younger Staneſby came the neareſt of any to perfection; but thoſe of Breſſan, though excellent in their tone, are all too flat in the upper octave. For theſe reaſons ſome are induced to think, that the utmoſt degree of proficiency on any of thoſe inſtruments is not worth the labour of attaining it.

German Flute, is an inſtrument entirely different from the common flute. It is not, like that, put into the mouth to be played; but the end is ſtopt with a tompion or plug, and the lower lip is applied to a hole about two inches and a half or three inches diſtant from the end. This inſtrument is uſually about a foot and a half long; rather bigger at the upper end than the lower; and perforated with holes, beſides that for the mouth, the loweſt of which is ſtopped and opened by the little finger's preſſing on a braſs or ſometimes a ſilver key, like thoſe in hautboys, baſſoons, &c. Its ſound is exceeding ſweet and agreeable; and ſerves as a treble in a concert. Flute

Flute, or Fluyt, is a kind of long veſſel, with flat ribs or floor-timbers, round behind, and ſwelled in the middle; ſerving chiefly for the carrying of proviſions in fleets or ſquadrons of ſhips; though it is often uſed in merchandize. The word *flute*, taken for a ſort of boat or veſſel, is derived, according to Borel, from the ancient *flotte*, a little boat. In the verbal proceſs of the miracles of St Catherine of Sweden, in the 12th century, we read *Unus equum ſuum una cum mercibus magni ponderis introduxit ſuper inſtrumentum de lignis fabricatum, vulgariter dictum fluta*. Upon which the Bollandiſts obſerve, that in ſome copies it is read *flotta*, an inſtrument called by the Latins *ratis*; and that the word *flutta* or *flotta* aroſe from *flotten* or *vlotten*, "to float."

Flutes, or Flutings, in architecture, are perpendicular channels or cavities cut along the ſhaft of a column or pilaſter. They are ſuppoſed to have been firſt introduced in imitation of the plaits of womens robes; and are therefore called by the Latins *ſtriges* and *ruge*. The French call them *cannelures*, as being excavations; and we, *flutes* or *flutings*, as bearing ſome reſemblance to the muſical inſtrument ſo called. They are chiefly affected in the Ionic order, in which they had their firſt riſe; though they are alſo uſed in all the richer orders, as the Corinthian and Compoſite; but rarely in the Doric, and ſcarce ever in the Tuſcan.

Flux, in medicine, an extraordinary iſſue or evacuation of ſome humour. Fluxes are various and variouſly denominated according to their ſeats or the humours thus voided; as a flux of the belly, uterine flux, hepatic flux, ſalival flux, &c. The flux of the belly is of four kinds, which have each their reſpective denominations, viz. the *lientery*, or *fluxus lientericus*; the *cæliac*, or *fluxus chyloſus*; the *diarrhœa*; and the *dyſentery*, or *bloody flux*;—all which are properly treated of in Medicine.

Flux, in hydrography, a regular periodical motion of the ſea, happening twice in 24 hours; wherein the water is raiſed and driven violently againſt the ſhores. The flux or flow is one of the motions of the tide; the other, whereby the water ſinks and retires, is called the reflux or ebb. There is alſo a kind of reſt or ceſſation of about half an hour between the flux and reflux; during which time the water is at its greateſt height, called *high-water*. The flux is made by the motion of the water of the ſea from the equator towards the poles; which, in its progreſs, ſtriking againſt the coaſts in its way, and meeting with oppoſition from them, ſwells, and where it can find paſſage, as in flats, rivers, &c. riſes up and runs into the land. This motion follows, in ſome meaſure, the courſe of the moon;

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Flux. as it loſes or comes later every day by about three quarters of an hour, or more preciſely, by 48 minutes; and by ſo much is the motion of the moon ſlower than that of the ſun. It is always higheſt and greateſt in full moons, particularly thoſe of the equinoxes. In ſome parts, as at Mount St Michael, it riſes 80 or 90 feet, though in the open ſea it never riſes above a foot or two; and in ſome places, as about the Morea, there is no flux at all. It runs up ſome rivers above 120 miles. Up the river Thames it only goes 80, viz. near to Kingſton in Surry. Above London bridge the water flows four hours and ebbs eight; and below the bridge, flows five hours and ebbs ſeven.

FLUX, in metallurgy, is ſometimes uſed ſynonymouſly with *fuſion*. For inſtance, an ore, or other matter, is ſaid to be in liquid flux, when it is completely fuſed.

But the word *flux* is generally uſed to ſignify certain ſaline matters, which facilitates the fuſion of ores, and other matters which are difficultly fuſible in eſſays and reductions of ores. Fixed alkalis, nitre, borax, tartar, and common ſalt, are the ſaline matters of which fluxes are generally compoſed. But the word *flux* is more particularly applied to mixtures of different proportions of only nitre and tartar; and theſe fluxes are called by particular names, according to the proportions of theſe ingredients, as in the following articles.

White FLUX, is made with equal parts of nitre and of tartar detonated together, by which they are alkaliſed. The reſiduum of this detonation is an alkali compoſed of the alkalis of the nitre and of the tartar, both which are abſolutely of the ſame nature. As the proportion of nitre in this mixture is more than is ſufficient to conſume entirely all the inflammable matter of the tartar, the alkali remaining after the detonation is perfectly white, and is therefore called *white flux*; and as this alkali is made very quickly, it is alſo called *extemporaneous alkali*. When a ſmall quantity only of white flux is made, as a few ounces for inſtance, ſome nitre always remains undecompoſed, and a little of the inflammable principle of the tartar, which gives a red or even a black colour to ſome part of the flux: but this does not happen when a large quantity of white flux is made; becauſe then the heat is much greater. This ſmall quantity of undecompoſed nitre and tartar which remains in white flux is not hurtful in moſt of the metallic fuſions in which this flux is employed: but if the flux be required perfectly pure, it might eaſily be diſengaged from thoſe extraneous matters by a long and ſtrong calcination, without fuſion. Flux.

Crude FLUX. By crude flux is meant the mixture of nitre and tartar in any proportions, without detonation. Thus the mixture of equal parts of the two ſalts uſed in the preparation of the white flux, or the mixture of one part of nitre and two parts of tartar for the preparation of the black flux, are each of them a crude flux before detonation. It has alſo been called *white flux*, from its colour: but this might occaſion it to be confounded with the white flux above deſcribed. The name, therefore, of crude flux is more convenient.

Crude flux is detonated and alkaliſed during the reductions and fuſions in which it is employed; and is then changed into white or black flux, according to the proportions of which it is compoſed. This detonation produces good effects in theſe fuſions and reductions, if the ſwelling and extravaſation of the detonating matters be guarded againſt. Accordingly, crude flux may be employed ſucceſsfully in many operations; as, for inſtance, in the ordinary operation for procuring the regulus of antimony.

Black FLUX. Black flux is produced from the mixture of two parts of tartar and one part of nitre detonated together. As the quantity of nitre which enters into the compoſition of this flux is not ſufficient to conſume all the inflammable matter of the tartar, the alkali which remains after the detonation contains much black matter, of the nature of coal, and is therefore called *black flux*.

This flux is deſignedly ſo prepared, that it ſhall contain a certain quantity of inflammable matter; for it is thereby capable, not only of facilitating the fuſion of metallic earths like the white flux, but alſo of reviving theſe metals by its phlogiſton. From this property it is alſo called *reducing flux*; the black flux, therefore, or crude flux made with ſuch proportions of the ingredients as to be convertible into black flux, ought always to be uſed when metallic matters are at once to be fuſed and reduced, or even when deſtructive metals are to be fuſed, as theſe require a continual ſupply of phlogiſton to prevent their calcination.

FLUXIONS;

A METHOD of calculation which greatly facilitates computations in the higher parts of mathematics. Sir Iſaac Newton and Mr Leibnitz contended for the honour of inventing it. It is probable they had both made progreſs in the ſame diſcovery, unknown to each other, before there was any publication on the ſubject.

In this branch of mathematics, magnitudes of every kind are ſuppoſed generated by motion; a line by the motion of a point, a ſurface by the motion of a line, and a ſolid by the motion of a ſurface. And ſome part of a figure is ſuppoſed generated by an uniform motion; in conſequence of which, the other parts may increaſe uniformly or with an accelerated or retarded motion, or may decreaſe in any of theſe ways; and the computations are made by tracing the comparative velocities with which the parts flow.

Fig. 1. If the parallelogram ABCD be generated by an uniform motion of the line AB toward CD while it moves from FE towards *fe*, while the line BF receives the increment F*f*, and the figure will be increaſed by the parallelogram *Fe*; the line FE in this caſe undergoes no variation. Plate CXCV.

The fluxion of any magnitude at any point is the increment that it would receive in any given time, ſuppoſing it to increaſe uniformly from that point; and as the meaſures will be the ſame, whatever the time be, we are at liberty to ſuppoſe it leſs than any aſſigned time.

The firſt letters in the alphabet are uſed to repreſent

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ſent invariable quantities; the letters x, y, z, variable quantities; and the ſame letters with points over them $\dot{x}$, $\dot{y}$, $\dot{z}$, repreſent their fluxions.

Therefore if AB$=a$, and BF$=x$; $\dot{Ef}$, the fluxion of BF, will be $=\dot{x}$, and $\dot{Fe}$, the fluxion of AF, $=a\dot{x}$.

If the rectangle be ſuppoſed generated by the uniform motion of FG towards CD, at the ſame time that HG moves uniformly towards AD, the point G keeping always on the diagonal, the lines FG, HG will flow uniformly; for while Bf receives the increment $\dot{Ef}$, and HB the increment $\dot{HK}$, FG will receive the increment $\dot{hg}$, and HG the increment $\dot{hg}$, and they will receive equal increments in equal ſucceſſive times. But the parallelogram will flow with an accelerated motion; for while F flows to f, and H to K, it is increaſed by the gnomon KGf; but while F and H flow through the equal ſpaces $\dot{fm}$ KL, it is increaſed by the gnomon Lgm greater than KGf; conſequently when fluxions of the ſides of a parallelogram are uniform, the fluxion of the parallelogram increaſes continually.

The fluxion of the parallelogram BHGF is the two parallelograms KG and Gf; for though the parameter receives an increment of the gnomon KGf, while its ſides flow to f and K, the part gG is owing to the additional velocity wherewith the parallelogram flows during that time; and therefore is no part of the meaſure of the fluxion, which muſt be computed by ſuppoſing the parameter to flow uniformly as it did at the beginning, without any acceleration.

Therefore if the ſides of a parallelogram be x and y, their fluxions will be $\dot{x}$ $\dot{y}$; and the fluxion of the parallelogram $x\dot{y}+y\dot{x}$; and if $x=y$, that is, if the figure be a ſquare, the fluxion of x^2 will be $2x\dot{x}$.

Fig. 2. Let the triangle ABC be deſcribed by the uniform motion of DE from A towards B, the point E moving in the line DF, ſo as always to touch the lines AC, CB; while D moves from A to F, DE is uniformly increaſed, and the increaſe of the triangle is uniformly accelerated. When DE is in the poſition FC, it is a maximum. As D moves from F to B, the line FC decreaſes, and the triangle increaſes, but with a motion uniformly retarded.

Fig. 3. If the ſemicircle AFB be generated by the uniform motion of CD from A towards B, while C moves from A to G, the line CD will increaſe, but with a retarded motion; the circumference alſo increaſes with a retarded motion, and the circular ſpace increaſes with an accelerated motion, but not uniformly, the degrees of acceleration growing leſs as CD approaches to the poſition GF. When C moves from G to B, it decreaſes with a motion continually accelerated, the circumference increaſes with a motion continually accelerated, and the area increaſes with a motion continually retarded, and more quickly retarded as CD approaches to B.

The fluxion of a quantity which decreaſes is to be conſidered as negative.

When a quantity does not flow uniformly, its fluxion may be repreſented by a variable quantity, or a line of a variable length; the fluxion of ſuch a line is called the *ſecond fluxion of the quantity whoſe fluxion that line is*: and if it be variable, a third fluxion may be deduced from it, and higher orders from theſe in the ſame manner: the ſecond fluxion is repreſented by two points, as $\ddot{x}$.

The increment a quantity receives by flowing for any given time, contains meaſures of all the different orders of fluxions; for if it increaſes uniformly, the whole increment is the firſt fluxion; and it has no ſecond fluxion. If it increaſes with a motion uniformly accelerated, the part of the increment occaſioned by the firſt motion meaſures the firſt fluxion, and the part occaſioned by the acceleration meaſures the ſecond fluxion. If the motion be not only accelerated, but the degree of acceleration continually increaſed, the two firſt fluxions are meaſured as before; and the part of the increment occaſioned by the additional degree of acceleration meaſures the third; and ſo on. Theſe meaſures require to be corrected, and are only mentioned here to illuſtrate the ſubject.

DIRECT METHOD.

Any flowing quantity being given, to find its fluxion.

Rule I. To find the fluxion of any power of a quantity, multiply the fluxion of the root by the exponent of the power, and the product by a power of the ſame root leſs by unity than the given exponent.

The fluxion of x^3 is $3x^2\dot{x}$, of x^n $nx^{n-1}\dot{x}$; for the root of x^n is x, whoſe fluxion is $\dot{x}$; which multiplied by the exponent n, and by a power of x leſs by unity than n, gives the above fluxion.

If x receive the increment $\dot{x}$, it becomes $x+\dot{x}$; raiſe both to the power of n, and x^n becomes $x^n+nx^{n-1}\dot{x}+\frac{n.n-1}{2}x^{n-2}\dot{x}^2+$, &c.; but all the parts of the increment, except the firſt term, are owing to the accelerated increaſe of x^n, and form meaſures of the higher fluxions. The firſt term only meaſures the firſt fluxion; the fluxion of $\overline{a^2+x^2}^{\frac{1}{2}}$ is $\frac{1}{2}\times 2x\dot{x}\times\overline{a^2+x^2}^{-\frac{1}{2}}$; for put $x=a^2+z^2$, we have $\dot{x}=2z\dot{z}$; and the fluxion of $x^{\frac{1}{2}}$, which is equal to the propoſed fluent, is $\frac{1}{2}x^{-\frac{1}{2}}\dot{x}$; for which ſubſtituting the values of z and x, we have the above fluxion.

Rule II. To find the fluxion of the product of ſeveral variable quantities multiplied together, multiply the fluxion of each by the product of the reſt of the quantities, and the ſum of the products thus ariſing will be the fluxion ſought.

Thus the fluxion of xy, is $x\dot{y}+y\dot{x}$; that of xyz, is $xy\dot{z}+x\dot{z}y+\dot{x}yz$; and that of $xyzu$, is $xyz\dot{u}+xy\dot{u}z+x\dot{z}yu+\dot{x}yzu$.

Rule III. To find the fluxion of a fraction—From the fluxion of the numerator multiplied by the denominator, ſubtract the fluxion of the denominator multiplied by the numerator, and divide the remainder by the ſquare of the denominator.

Thus, the fluxion of $\frac{x}{y}$ is $\frac{\dot{x}y-x\dot{y}}{y^2}$; that of $\frac{x}{x+y}$, is $\frac{\dot{x}\times\overline{x+y}-x\dot{\overline{x+y}}\times x}{\overline{x+y}^2}=\frac{\dot{x}y-x\dot{y}}{\overline{x+y}^2}$.

Rule

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RULE IV. In complex cases, let the particulars be collected from the simple rules, and combined together.

The fluxion of $\frac{x^2y^2}{z}$ is $\frac{2x^2yy+2y^2xx\times z-x^2y^2z}{z^2}$; for the fluxion of x^2 is $2xx$, and of y^2 is $2yy$, by Rule I. and therefore the fluxion of x^2y^2 (by Rule II.) $2x^2yy+2y^2xx$; from which multiplied by z, (by Rule III.) and subtracting from it the fluxion of the denominator z, multiplied by the numerator, and dividing the whole by the square of the denominator, gives the above fluxion.

RULE V. The second fluxion is derived from the first, in the same manner as the first from the flowing quantity.

Thus the fluxion of x^3, $3x^2\dot{x}$; its second, $6x\dot{x}^2+3x^2\ddot{x}$ (by Rule II.); and so on: but if x be invariable, $\ddot{x}=0$, and the second fluxion of $x^3=6x\dot{x}^2$.

PROB. I. *To determine maxima and minima.*

WHEN a quantity increases, its fluxion is positive; when it decreases, it is negative; therefore when it is just betwixt increasing and decreasing, its fluxion is $=0$.

RULE. Find the fluxion, make it $=0$, whence an equation will result that will give an answer to the question.

EXAMP. To determine the dimensions of a cylindric measure ABCD, (fig. 4.) open at the top, which shall contain a given quantity (of liquor, grain, &c.) under the least internal superficies possible.

Let the diameter AB$=x$, and the altitude AD$=y$; moreover, let p (3,14159, &c.) denote the periphery of the circle whose diameter is unity, and let c be the given content of the cylinder. Then it will be $1:p::x:(px)$ the circumference of the base; which, multiplied by the altitude y, gives pxy for the concave superficies of the cylinder. In like manner, the area of the base, by multiplying the same expression into $\frac{1}{4}$ of the diameter x, will be found $=\frac{px^2}{4}$; which drawn into the altitude y, gives $\frac{px^2y}{4}$ for the solid content of the cylinder; which being made $=c$, the concave surface pxy will be found $=\frac{4c}{x}$, and consequently the whole surface $=\frac{4c}{x}+\frac{px^2}{4}$: Whereof the fluxion, which is $-\frac{4c\dot{x}}{x^2}+\frac{p\dot{x}}{2}$ being put $=0$, we shall get $-8c\times px^3=0$; and therefore $x=2\sqrt[3]{\frac{c}{p}}$ further, because $px^3=8c$, and $px^2y=4c$, it follows, that $x=2y$; whence y is also known, and from which it appears that the diameter of the base must be just double of the altitude.

Fig. 7. To find the longest and shortest ordinates of any curve, DEF, whose equation or the relation which the ordinates bear to the abscissas is known.

Make AC the abscissa x, and CE the ordinate $=y$; take a value y in terms of x, and find its fluxion; which making $=0$, an equation will result whose roots give the value of x when y is a maximum or a minimum.

To determine when it is a maximum and when a minimum, take the value of y, when x is a little more than the root of the equation so found, and it may be perceived whether it increases or decreases.

If the equation has an even number of equal roots, y will be neither a maximum nor minimum when its fluxion is $=0$.

PROB. II. *To draw a tangent to any curve.*

Fig. 5. When the abscissa CS of a curve moves uniformly from A to B, the motion of the curve will be retarded if it be concave, and accelerated if convex towards AB; for a straight line TC is described by an uniform motion, and the fluxion of the curve at any point is the same as the fluxion of the tangent, because it would describe the tangent if it continued to move equally from that point. Now if Ss or Ce be the fluxion of the base, Cd will be the fluxion of the tangent, and de of the ordinate. And because the triangles TSC, Ced, are equiangular, $de:ce::$ CS : ST, wherefore,

RULE. Find a fourth proportional to the fluxion of the ordinate valued in terms of the abscissa, the fluxion of the abscissa, and the ordinate, and it determines the line ST, which is called the *semi-tangent*, and TC joined is a tangent to the curve.

EXAMP. To draw a right line CT, (fig. 6.) to touch a given circle BCA in a point C.

Let CS be perpendicular to the diameter AB, and put AB$=a$, BS$=x$, and SC$=y$: then, by the property of the circle, y^2 (CS^2) $=$BS$\times$AS $(=x\times\overline{a-x})=ax-x^2$; whereof the fluxion being taken, in order to determine the ratio of $\dot{x}$ and $\dot{y}$, we get $2y\dot{y}=a\dot{x}-2x\dot{x}$; consequently $\frac{\dot{x}}{\dot{y}}=\frac{2y}{a-2x}=\frac{y}{\frac{1}{2}a-x}$; which multiplied by y, gives $\frac{y\dot{x}}{\dot{y}}=\frac{y^2}{\frac{1}{2}a-x}=$ the subtangent ST. Whence (O being supposed the centre) we have OS $(\frac{1}{2}a-x):$ CS $(y):$ CS $(y):$ ST; which we also know from other principles.

PROB. III. *To determine points of contrary flexure in curves.*

FIG. 7. Supposing C to move uniformly from A to B, the curve DEF will be convex towards AB when the celerity of E increases, and concave when it decreases; therefore at the point where it ceases to be convex and begins to be concave, or the opposite way, the celerity of E will be uniform, that is, CE will have no second fluxion. Therefore,

RULE. Find the second fluxion of the ordinate in terms of the abscissa, and make it $=0$; and from the equation that arises you get a value of the abscissa, which determines the point of contrary flexure.

EX. Let the nature of the curve ARS be defined by the equation $ay=a^{\frac{1}{2}}x^{\frac{1}{2}}+xx$, (the abscissa AF and the ordinate FG being, as usual, represented by x and y respectively). Then $\dot{y}$, expressing the celerity of the point r, in the line FH, will be equal to $\frac{\frac{1}{2}a^{\frac{1}{2}}x^{-\frac{1}{2}}\dot{x}+2x\dot{x}}{a}$: Whose fluxion, or that of $\frac{1}{2}a^{\frac{1}{2}}x^{-\frac{1}{2}}+2x$ (because a and

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and $\dot{x}$ are constant) must be equal to nothing; that is, $-\frac{1}{4}a^{\frac{1}{2}}x^{-\frac{1}{2}}\dot{x}+2\dot{x}=0$: Whence $a^{\frac{1}{2}}x^{-\frac{1}{2}}=8$, $a^{\frac{1}{2}}=8x^{\frac{1}{2}}$ $64x^3=a^3$, and $x=\frac{1}{4}a=AF$; therefore FG $\left(=\frac{a^{\frac{1}{2}}x^{\frac{1}{2}}+x\dot{x}}{\dot{a}}\right)$ $=\frac{9}{16}a$: From which the position of the point G is given.

PROB. IV. *To find the radii of curvature.*

THE curvature of a circle is uniform in every point, that of every other curve continually varying: and it is measured at any point by that of a circle whose radius is of such a length as to coincide with it in curvature in that point.

All curves that have the same tangent have the same first fluxion, because the fluxion of a curve and its tangent are the same. If it moved uniformly on from the point of contact, it would describe the tangent. And the deflection from the tangent is owing to the acceleration or retardation of its motion, which is measured by its second fluxion: and consequently two curves which have not only the same tangent, but the same curvature at the point of contact, will have both their first and second fluxions equal. It is easily proven from thence, that the radius of curvature is $=\frac{\dot{x}^3}{\dot{\dot{y}}\dot{x}-\dot{\dot{x}}\dot{y}}$, x, y, and z represent the abscissa, ordinate, and curve respectively.

EXAMP. Let the given curve be the common parabola, whose equation is $y=a^{\frac{1}{2}}x^{\frac{1}{2}}$: Then will $\dot{y}=\frac{1}{2}a^{\frac{1}{2}}\dot{x}x^{-\frac{1}{2}}$ $=\frac{a^{\frac{1}{2}}\dot{x}}{2x^{\frac{1}{2}}}$, and (making $\dot{x}$ constant) $\ddot{y}=\frac{1}{2}\times\frac{1}{2}a^{\frac{1}{2}}\dot{x}^2x^{-\frac{1}{2}}=$ $-\frac{a^{\frac{1}{2}}\dot{x}^2}{4x^{\frac{3}{2}}}$: Whence $\dot{z}\left(\sqrt{\dot{x}^2+\dot{y}^2}\right)=\frac{\dot{x}}{2}\sqrt{\frac{4x+a}{x}}$, and the radius of curvature $\left(\frac{\dot{z}^3}{-\dot{\dot{y}}\dot{x}}\right)=\frac{a+4x^{\frac{1}{2}}}{2\sqrt{a}}$: Which at the vertex, where $x=0$, will be $=\frac{1}{2}a$.

INVERSE METHOD.

From a given fluxion to find a fluent.

THIS is done by tracing back the steps of the direct method. The fluxion of x is $\dot{x}$; and therefore the fluent of $\dot{x}$ is x: but as there is no direct method of finding fluents, this branch of the art is imperfect. We can assign the fluxion of every fluent; but we cannot assign the fluent of a fluxion, unless it be such a one as may be produced by some rule in the direct method from a known fluent.

GENERAL RULE. Divide by the fluxion of the root, add unity to the exponent of the power, and divide by the exponent so increased.

For, dividing the fluxion $nx^{n-1}\dot{x}$ by $\dot{x}$ (the fluxion of the root x) it becomes nx^{n-1}; and, adding 1 to the exponent $(n-1)$, we have nx^n; which, divided by n, gives x^n, the true fluent of $nx^{n-1}\dot{x}$.

Hence (by the same rule) the

Fluent of $3x^2\dot{x}$ will be $=x^3$;

That of $8x^3\dot{x}=\frac{8x^3}{3}$;

That of $2x^5\dot{x}=\frac{x^6}{3}$;

That of $y^{\frac{2}{3}}\dot{y}=\frac{3}{5}y^{\frac{5}{3}}$.

Sometimes the fluent so found requires to be corrected. The fluxion of x is $\dot{x}$, and the fluxion of $a+x$ is also $\dot{x}$; because a is invariable, and has therefore no fluxion.

Now when the fluent of $\dot{x}$ is required, it must be determined, from the nature of the problem, whether any invariable part, as a, must be added to the variable part x.

When fluents cannot be exactly found, they can be approximated by infinite series.

Ex. Let it be required to approximate the fluent of $\frac{\overline{a^2-x^2}|^{\frac{1}{2}}\times x^n\dot{x}}{\overline{c^4-x^2}|^{\frac{1}{2}}}$ in an infinite series.

The value of $\frac{\overline{a^2-x^2}|^{\frac{1}{2}}}{\overline{c^2-x^2}|}$, expressed in a series, is $\frac{a}{c}+$ $\frac{a}{2c^3}-\frac{1}{2ac}\times x^2+\frac{3a}{8c^5}-\frac{1}{4ac^3}-\frac{1}{8a^3c}\times x^4+\frac{5a}{16c^7}-\frac{3}{16ac^5}$ $\frac{1}{16a^3c^3}$ $\frac{1}{16a^5c}\times x^6+$ &c. Which value being therefore multiplied by $x^n\dot{x}$, and the fluent taken (by the common method) we get $\frac{ax^{n+1}}{n+1\times c}+\frac{a}{2c^3}-\frac{1}{2ac}\times\frac{x^{n+3}}{n+3}+$ $\frac{3a}{8c^5}-\frac{1}{4ac^3}-\frac{1}{8a^3c}\times\frac{x^{n+5}}{n+5}+$ $\frac{5a}{16c^7}-\frac{3}{16ac^5}-\frac{1}{16a^3c^3}-\frac{1}{16a^5c}\times\frac{x^{n+7}}{n+7}+$ &c.

PROB. I. *To find the area of any curve.*

RULE. Multiply the ordinate by the fluxion of the abscissa, and the product gives the fluxion of the figure, whose fluent is the area of the figure.

EXAMP. 1. Fig. 8. Let the curve ARMH, whose area you will find, be the common parabola. Let s represent the area, and $\dot{s}$ its fluxion.

In which case the relation of AB (x) and BR (y) being expressed by $y^2=ax$ (where a is the parameter) we thence get $y=a^{\frac{1}{2}}x^{\frac{1}{2}}$; and therefore $\dot{s}=$ RmHB $(=y\dot{x})$ $=a^{\frac{1}{2}}x^{\frac{1}{2}}\dot{x}$: whence $s=\frac{2}{3}\times a^{\frac{1}{2}}x^{\frac{3}{2}}=\frac{2}{3}a^{\frac{1}{2}}x^{\frac{1}{2}}\times x=\frac{2}{3}yx$ (because $a^{\frac{1}{2}}x^{\frac{1}{2}}=y$) $=\frac{2}{3}\times$AB$\times$BR: hence a parabola is $\frac{2}{3}$ of a rectangle of the same base and altitude.

EXAMP. 2. Let the proposed curve CSDR (fig. 9.) be of such a nature, that (supposing AB unity) the sum of the areas CSTBC and CDGBC answering to any two proposed abscissas AT and AG, shall be equal to the area CRNBC, whose corresponding abscissa AN is equal

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equal to AT×AG, the product of the measures of the two former abscissas.

First, in order to determine the equation of the curve (which must be known before the area can be found), let the ordinates GD and NR move parallel to themselves towards HF; and then having put GD=y, NR=z, AT=a, AG=s, and AN=u, the fluxion of the area CDGB will be represented by $y\dot{s}$, and that of the area CRNB by $z\dot{u}$: which two expressions must, by the nature of the problem, be equal to each other; because the latter area CRNB exceeds the former CDGB by the area CSTB, which is here considered as a constant quantity: and it is evident, that two expressions, that differ only by a constant quantity, must always have equal fluxions.

Since, therefore, $y\dot{s}$ is $=z\dot{u}$, and $u=as$, by hypothesis, it follows, that $\dot{u}=a\dot{s}$, and that the first equation (by substituting for u) will become $y\dot{s}=az\dot{s}$, or $y=az$, or lastly $y\dot{s}=za\dot{s}$, that is, GD×AG=NR×AN: therefore, GD : NR :: AN : AG; whence it appears, that every ordinate of the curve is reciprocally as its corresponding abscissa.

Now, to find the area of the curve so determined, put AB=1, BC=b, and BG=x: then, since AG $(1+x)$: AB (1) :: BC (b) : GD (y) we have $y=\frac{b}{1+x}$, consequently $\dot{u}\ (=y\dot{x})=\frac{b\dot{x}}{1+x}=b\times\dot{x}-x\dot{x}+x^2\dot{x}-x^3\dot{x}+x^4\dot{x}-$ &c. Whence, BGDC, the area itself will be $=bx-\frac{x^2}{2}+\frac{x^3}{3}-\frac{x^4}{4}+\frac{x^5}{5}$, &c. which was to be found.

Hence it appears, that as these areas have the same properties as logarithms, this series gives an easy method of computing logarithms; and the fluent may be found by means of a table of logarithms, without the trouble of an infinite series: and every fluxion whose fluent agrees with any known logarithmic expression, may be found the same way. Hence the fluents of fluxions of the following forms are deduced.

The fluent of $\frac{\dot{x}}{\sqrt{x^2\pm a^2}}$ = hyp. log. of $x+\sqrt{x^2\pm a^2}$;

of $\frac{\dot{x}}{\sqrt{2ax+x^2}}$ = hyp. log. $a\times x+\sqrt{2ax+x^2}$;

of $\frac{2a\dot{x}}{a^2-x^2}$ hyp. log. of $\frac{a+x}{a-x}$;

and of $\frac{2a\dot{x}}{x\sqrt{a^2\pm x^2}}$ = hyp. log. $\frac{a-\sqrt{a^2\pm x^2}}{a+\sqrt{a^2\pm x^2}}$

Prob. 2. *To determine the length of curves.*

Fig. 5. Because Cde is a right-angle triangle, $Cd^2=Ce^2+de^2$; wherefore the fluxions of the abscissa and ordinate being taken in the same terms and squared, their sum gives the square of the fluxion of the curve; whose root being extracted, and the fluent taken, gives the length of the curve.

Examp. To find the length of a circle from its tangent. Make the radius AO (fig. 5.) $=a$, the tangent of AC$=t$, and its secant $=s$, the curve $=z$, and its fluxion $=\dot{z}$; because the triangles OTC, OCS, are similar, OT : OC :: OC : OS; whence OS $=\frac{a^2}{s}$, and SA$=a-\frac{a^2}{s}=a-\frac{a^2}{\sqrt{a^2+t^2}}$; whose fluxion is $\frac{a^2t\dot{t}}{a^2+t^2|^{\frac{3}{2}}}$; and because the triangles OTC, dCe are similar, TC $(=t)$: TO $(=\sqrt{a^2+t^2})$ :: Ce $=\left(\frac{a^2t\dot{t}}{a^2+t^2|^{\frac{3}{2}}}\right)$: C$d=\frac{a^2\dot{t}}{a^2+t^2}$ = fluxion of the curve. Now by converting this into an infinite series we have the fluxion of the curve $=\dot{t}-\frac{t^2\dot{t}}{a^2}+\frac{t^4\dot{t}}{a^4}-\frac{t^6\dot{t}}{a^6}$, &c. and consequently $z=-\frac{t^3}{3a^2}+\frac{t^5}{5a^4}-\frac{t^7}{7a^6}+\frac{t^9}{9a^8}$, &c. = AR. Where, if (for example's sake) AR be supposed an arch of 30 degrees, and AO (to render the operation more easy) be put = unity, we shall have $t=\sqrt{\frac{1}{3}}=.5773502$ (because $Ob\sqrt{\frac{3}{4}}:bR\ (\frac{1}{2})$ :: OA (1) : AT $(t)=\sqrt{\frac{1}{3}}$) Whence,

t^3 $(=t\times t^2=t\times\frac{1}{3})=.1924500$

t^5 $\left(=t^3\times t^2=\frac{t^3}{3}\right)=.0641500$

t^7 $\left(=t^5\times t^2=\frac{t^5}{3}\right)=.0213833$

t^9 $\left(=t^7\times t^2=\frac{t^7}{3}\right)=.0071277$

t^{11} $\left(=t^9\times t^2=\frac{t^9}{3}\right)=.0023759$

t^{13} $\left(=t^{11}\times t^2=\frac{t^{11}}{3}\right)=.0007919$

t^{15} $\left(=t^{13}\times t^2=\frac{t^{13}}{3}\right)=.0002639$

&c.

And therefore AR $=.5773502-\frac{.1924500}{3}+\frac{.0641500}{5}-\frac{.0213833}{7}+\frac{.0071277}{9}-\frac{.0023759}{11}+\frac{.0007919}{13}-\frac{.0002639}{15}+\frac{.0000879}{17}-\frac{.0000293}{19}+\frac{.0000097}{21}-\frac{.0000032}{23}=.5235987$: for the length of an arch of 30 degrees, which multiplied by 6 gives 3.141592+ for the length of the semi-periphery of the circle whose radius is unity.

Other series may be deduced from the versed sine and secant; and these are of use for finding fluents which cannot be expressed in finite terms.

The fluent of $\left\{\begin{array}{l}\frac{\dot{w}}{\sqrt{2aw-w^2}}\\ \frac{\dot{w}}{\sqrt{a^2-w^2}}\\ \frac{a\dot{w}}{a^2+w^2}\\ \frac{a\dot{w}}{w\sqrt{w^2-a^2}}\end{array}\right.$ is equal to the arch whose $\left\{\begin{array}{l}\text{Versed sine}\\ \text{Right sine}\\ \text{Tangent}\\ \text{Secant}\end{array}\right.$ is $\frac{w}{a}$, and Radius Unity.

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PROB. 3. *To find the contents of a solid.*

LET the surface of the generating plane be multiplied by the space it passes through in any time, the product will give a solid which is the fluxion of the solid required: the surface must therefore be computed in terms of x, which represents the line or axis on which it moves, and by its motion on which the fluxion is to be measured, and the fluent found will give the contents of the solid.

EXAMP. Let it be proposed to find the content of a cone ABC, fig. 10.

Put the given altitude (AD) of the cone $=a$, and the semidiameter (BD) of its base $=b$, the solid $=s$, its fluxion $=\dot{s}$, and the area of a circle, whose radius is unity, $=p$: then the distance (AF) of the circle EG, from the vertex A, being denoted by x, we have, by similar triangles, as $a : b :: x : \text{EF}\ (y) = \frac{bx}{a}$. Whence in this case, $\dot{s}\ (=py^2\dot{x}) = \frac{pb^2x^2\dot{x}}{a^2}$; and consequently $s = \frac{pb^2x^3}{3a^2}$; which, when $x=a$ (=AD) gives $\frac{pb^2a}{3}$ ($=p\times\text{BD}^2\times\frac{1}{3}\text{AD}$) for the content of the whole cone ABC: which appears from hence to be just $\frac{1}{3}$ of a cylinder of the same base and altitude.

PROB. 4. *To compute the surface of any solid body.*

THE fluxion of the surface of the solid is equal to the periphery of the surface, by whose motion the solid is generated, multiplied by its velocity on the edge of the solid, and the computation is made as in the foregoing.

EXAMP. Let it be proposed to determine the convex superficies of a cone ABC, fig. 11.

Then, the semidiameter of the base (BD or CD) being put $=b$, the slanting line or hypothenuse AC$=c$, and FH (parallel to DC) $=y$, AG $=x$, the surface $=w$, its fluxion $=\dot{w}$, and $p=$ the periphery of a circle whose diameter is unity, we shall, from the similarity of the triangles ADC and Hmb, have $b : c :: \dot{y}\ (mb : \dot{x}\ (\text{H}b) = \frac{c\dot{y}}{b}$: whence $\dot{w}\ (2py\dot{z}) = \frac{2pcy\dot{y}}{b}$; and consequently $w = \frac{pcy^2}{b}$. This, when $y=b$, becomes $=pcb=p\times\text{DC}\times\text{AC}=$ the convex superficies of the whole cone ABC: which therefore is equal to a rectangle under half the circumference of the base and the slanting line.

The method of fluxions is also applied to find the centres of gravities, and oscillation of different bodies; to determine the paths described by projectiles and bodies acted on by central forces, with the laws of centripetal force in different curves, the retardates given to motions performed in resisting medii, the attractions of bodies under different forms, the direction of wind which has the greatest effect on an engine, and to solve many other curious and useful problems.

FLY

Fly. FLY, in zoology, a large order of insects, the distinguishing characteristic of which is, that their wings are transparent. By this they are distinguished from beetles, butterflies, grasshoppers, &c.

Flies are subdivided into those which have four, and those which have two wings.

Of those with four wings there are several genera or kinds; as the ant, apis, ichneumon, &c. See APIS, FORMICA, &c.

Of those with two wings, there are likewise several kinds, as the gad-fly, gnat, &c. See *GAD-Fly*, &c.

Those who desire a more particular account of the anatomy, generation, structure, and manifold subdivisions of flies, may consult Reaumer's History of Insects, tom. 4. See also ENTOMOLOGY.

House-Fly. See MUSCA.

Pestilential Fly. See ETHIOPIA, n° 11.

FLY, in mechanics, a cross with leaden weights at its ends; or rather, a heavy wheel at right angles, to the axis of a windlass, jack, or the like; by means of which, the force of the power, whatever it is, is not only preserved, but equally distributed in all parts of the revolution of the machine. See MECHANICS.

Flies for Fishing. See *FISHING-Fly*.

Vegetable Fly, a very curious natural production chiefly found in the West Indies. "Excepting that it has no wings, it resembles the drone both in size and colour more than any other British insect. In the month of May it buries itself in the earth, and begins to vegetate. By the latter end of July, the tree is arrived at its full growth, and resembles a coral branch; and is about three inches high, and bears several little pods, which dropping off become worms, and from thence flies, like the British caterpillar."

Such was the account originally given of this extraordinary production. But several boxes of these flies having been sent to Dr Hill for examination, his report was this: "There is in Martinique a fungus of the clavaria kind, different in species from those hitherto known. It produces soboles from its sides; I call it therefore *clavaria sobolifera*. It grows on putrid animal bodies, as our *fungus ex pede equino* from the dead horse's hoof. The cicada is common in Martinique, and in its nympha state, in which the old authors call it *tettigometra*: it buries itself under dead leaves to wait its change; and when the season is unfavourable, many perish. The seeds of the clavaria find a proper bed on this dead insect, and grow. The tettigometra is among the cicadæ in the British museum; the clavaria is just now known. This is the fact, and all the fact; though the untaught inhabitants suppose a fly to vegetate, and though there is a Spanish drawing of the plants growing into a trifoliate tree, and it has been figured with the creature flying with this tree upon its back." *Phil. Trans.* for 1763.

The ingenious Mr Edwards has taken notice of this extraordinary production in his Gleanings of Natural History, from which the figures on Plate CXCVI. are taken.

Fly-Boat, or *Flight*, a large flat-bottomed Dutch vessel

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FLUXIONS.

Plate CXCV.

Fig. 1.

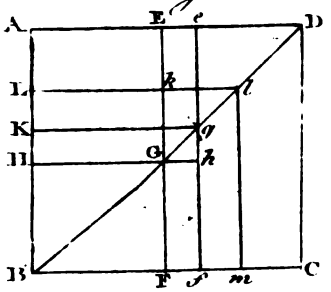


Fig. 2.

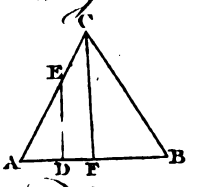


Fig. 3.

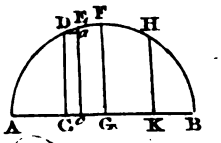


Fig. 4.

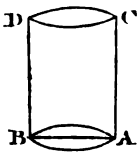


Fig. 5.

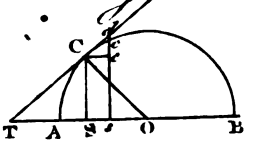


Fig. 6.

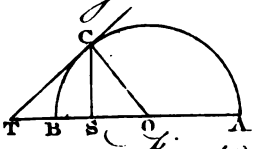


Fig. 7.

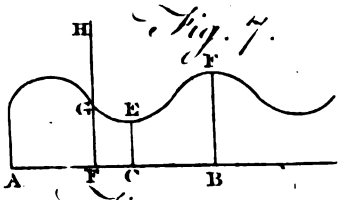


Fig. 8.

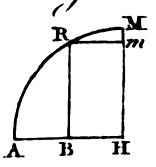


Fig. 9.

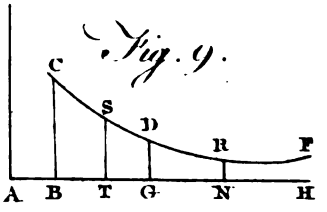


Fig. 10.

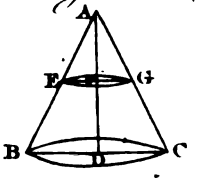
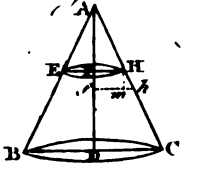
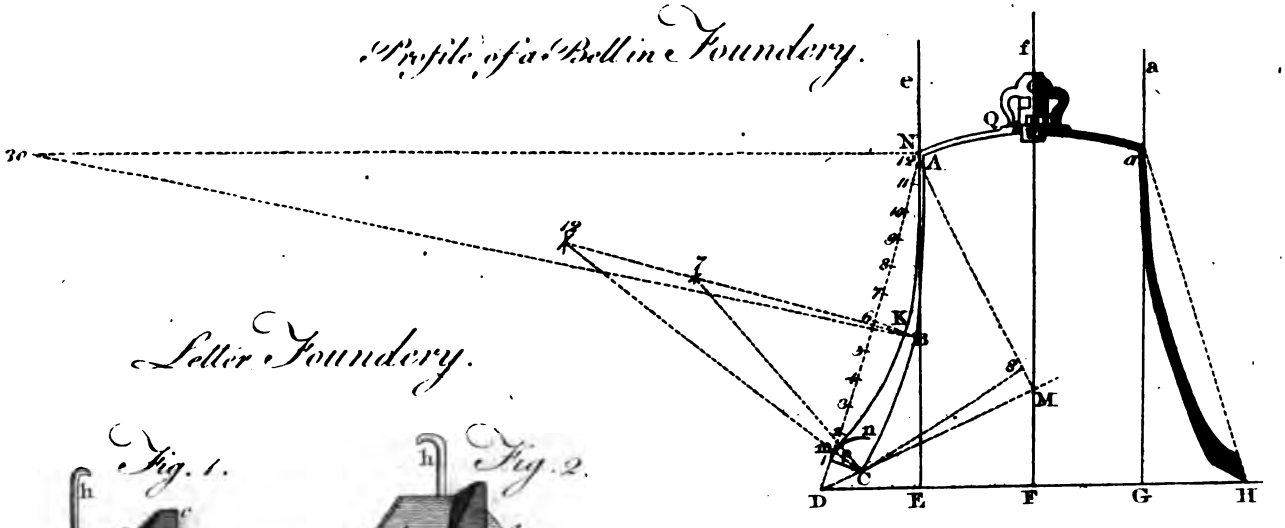


Fig. 11.



FOUNDERY.

Profile of a Bell in Foundery.



Letter Foundery.

Fig. 1.

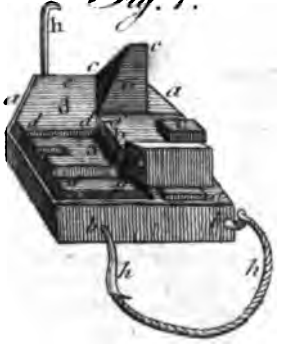
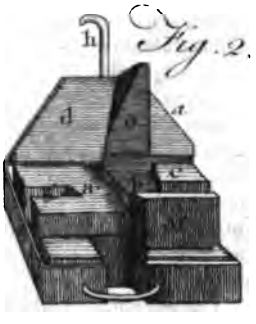
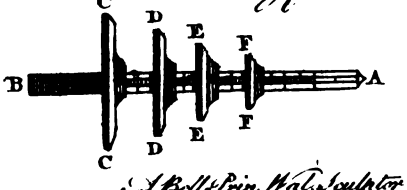


Fig. 2.



Forestaff.



J. Bell le Prin. Wal. Sculptor fecit.

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Fly, Flyers.

veſſel, whoſe burden is generally from 600 to 1200 tons. It is diſtinguiſhed by a ſtern remarkably high, reſembling a Gothic turret, and by very broad buttocks below.

Fly-Catcher, in zoology. See MUSCICAPA.

Fly-Trap, in botany, a newly diſcovered ſenſitive plant. See *DIONÆA Muſcipula*.

Fly-Tree, in natural hiſtory, a name given by the common people of America to a tree, whoſe leaves, they ſay, at a certain time of the year produce *flies*. On examining theſe leaves about the middle of ſummer, the time at which the flies uſe to be produced, there are found on them a ſort of bags of a tough matter, of about the ſize of a filbert, and of a duſky greeniſh colour. On opening one of theſe bags with a knife, there is uſually found a ſingle full-grown fly, of the gnat kind, and a number of ſmall worms, which in a day or two more have wings and flee away in the form of their parent. The tree is of the mulberry kind, and its leaves are uſually very largely ſtocked with theſe inſect-bags; and the generality of them are found to contain the inſects in their worm-ſtate; when they become winged, they ſoon make their way out. The bags begin to appear when the leaves are young; and afterwards grow with them; but they never rumple the leaf or injure its ſhape. They are of the kind of leaf-galls, and partake in all reſpects, except ſize, of a ſpecies we have frequent on the large maple, or, as it is called, the *ſycamore*.

FLYERS, in architecture, ſuch ſtairs as go ſtraight, and do not wind round, nor have the ſteps made tapering; but the fore and back part of each ſtair and the ends reſpectively parallel to one another: So that if one flight do not carry you to your deſigned height, there is a broad half ſpace; and then you fly again, with ſteps every where of the ſame breadth and length as before.

FLYERS, the performers in a celebrated exhibition among the Mexicans, which was made on certain great feſtivals, and is thus deſcribed by Clavigero in his Hiſtory of that people. "They ſought in the woods for an extremely lofty tree, which, after ſtripping it of its branches and bark, they brought to the city, and fixed in the centre of ſome large ſquare. They caſed the point of the tree in a wooden cylinder, which, on account of ſome reſemblance in its ſhape, the Spaniards called a *mortar*. From this cylinder hung four ſtrong ropes, which ſerved to ſupport a ſquare frame. In the ſpace between the cylinder and the frame, they fixed four other thick ropes, which they twiſted as many times round the tree as there were revolutions to be made by the flyers. Theſe ropes were drawn through four holes, made in the middle of the four planks of which the frame conſiſted. The four principal flyers, diſguiſed like eagles, herons, and other birds, mounted the tree with great agility, by means of a rope which was laced about it from the ground up to the frame; from the frame they mounted one at a time ſucceſſively upon the cylinder, and after having danced there a little, they tied themſelves round with the ends of the ropes, which were drawn through the holes of the frame, and launching with a ſpring from it, began their flight with their wings expanded. The action of their bodies put the frame and the cylinder in motion; the frame by its revolutions gradually untwiſted the cords by which the flyers ſwung; ſo that as the ropes lengthened, they made ſo much the greater circles in their flight. Whilſt theſe four were flying, a fifth danced upon the cylinder, beating a little drum, or waving a flag, without the ſmalleſt apprehenſion of the danger he was in of being precipitated from ſuch a height. The others who were upon the frame (there having been 10 or 12 perſons generally who mounted), as ſoon as they ſaw the flyers in their laſt revolution, precipitated themſelves by the ſame ropes, in order to reach the ground at the ſame time amidſt the acclamations of the populace. Thoſe who precipitated themſelves in this manner by the ropes, that they might make a ſtill greater diſplay of their agility, frequently paſſed from one rope to another, at that part where, on account of the little diſtance between them, it was poſſible for them to do ſo. The moſt eſſential point of this performance conſiſted in proportioning ſo juſtly the height of the tree with the length of the ropes, that the flyers ſhould reach the ground with 13 revolutions, to repreſent by ſuch number their century of 52 years, compoſed in the manner we have already mentioned. This celebrated diverſion is ſtill in uſe in that kingdom; but no particular attention is paid to the number of the revolutions or the flyers; as the frame is commonly ſexagonal or octagonal, and the flyers 6 or 8 in number. In ſome places they put a rail round the frame, to prevent accidents which were frequent after the conqueſt; as the Indians became much given to drinking, and uſed to mount the tree when intoxicated with wine or brandy, and were unable to keep their ſtation on ſo great a height, which was uſually 60 feet." See Plate CXCVI.

Flying.

FLYING, the progreſſive motion of a bird, or other winged animal, in the air.

The parts of birds chiefly concerned in flying are the wings and tail: by the firſt, the bird ſuſtains and wafts himſelf along; and by the ſecond, he is aſſiſted in aſcending and deſcending, to keep his body poiſed and upright, and to obviate the vacillations thereof.

It is by the largeneſs and ſtrength of the pectoral muſcles, that birds are ſo well diſpoſed for quick, ſtrong, and continued flying. Theſe muſcles, which in men are ſcarce a 70th part of the muſcles of the body in birds, exceed and outweigh all the other muſcles taken together; upon which Mr Willoughby makes this reflection, that if it be poſſible for man to fly, his wings muſt be ſo contrived and adapted, that he may make uſe of his legs, and not his arms, in managing them.

The tail, Meſſrs Willoughby, Ray, and many others, imagine to be principally employed in ſteering and turning the body in the air, as a rudder: but Borelli has put it beyond all doubt, that this is the leaſt uſe of it, which is chiefly to aſſiſt the bird in its aſcent and deſcent in the air, and to obviate the vacillations of the body and wings: for, as to turning to this or that ſide, it is performed by the wings and inclination of the body, and but very little by the help of the tail. The flying of a bird, in effect, is quite a different thing from the rowing of a veſſel. Birds do not vibrate their wings towards the tail, as oars are ſtruck towards the ſtern,

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Flying. ſtern, but waſt them downwards; nor does the tail of the bird cut the air at right angles, as the rudder does the water; but is diſpoſed horizontally, and preſerves the ſame ſituation what way ſoever the bird turns. In effect, as a veſſel is turned about on its centre of gravity to the right, by a briſk application of the oars to the left; ſo a bird, in beating the air with its right wing alone, towards the tail, will turn its fore-part to the left. Thus pigeons changing their courſe to the left, would labour it with their right wing, keeping the other almoſt at reſt. Birds of a long neck alter their courſe by the inclination of their head and neck; which altering the courſe of gravity, the bird will proceed in a new direction.

The manner of FLYING is thus: The bird firſt bends his legs, and ſprings with a violent leap from the ground; then opens and expands the joints of his wings, ſo as to make a right line perpendicular to the ſides of his body: thus the wings, with all the feathers therein, conſtitute one continued lamina. Being now raiſed a little above the horizon, and vibrating the wings with great force and velocity perpendicularly againſt the ſubject air, that fluid reſiſts thoſe ſucceſſions, both from its natural inactivity and elaſticity, by means of which the whole body of the bird is protruded. The reſiſtance the air makes to the withdrawing of the wings, and conſequently the progreſs of the bird, will be ſo much the greater, as the waſt or ſtroke of the fan of the wing is longer: but as the force of the wing is continually diminiſhed by this reſiſtance, when the two forces continue to be *in equilibrio*, the bird will remain ſuſpended in the ſame place; for the bird only aſcends ſo long as the arch of air the wing deſcribes makes a reſiſtance equal to the exceſs of the ſpecific gravity of the bird above the air. If the air, therefore, be ſo rare as to give way with the ſame velocity as it is ſtruck withal, there will be no reſiſtance, and conſequently the bird can never mount. Birds never fly upwards in a perpendicular line, but always in a parabola. In a direct aſcent, the natural and artificial tendency would oppoſe and deſtroy each other, ſo that the progreſs would be very ſlow. In a direct deſcent they would aid one another, ſo that the fall would be too precipitate.

Artificial FLYING, that attempted by men, by the aſſiſtance of mechanics.

The art of flying has been attempted by ſeveral perſons in all ages. The Leucadians, out of ſuperſtition, are reported to have had a cuſtom of precipitating a man from a high cliff into the ſea, firſt fixing feathers, variouſly expanded, round his body, in order to break the fall.

Friar Bacon, who lived near 500 years ago, not only affirms the art of flying poſſible, but aſſures us, that he himſelf knew how to make an engine wherein a man ſitting might be able to convey himſelf through the air like a bird; and further adds, that there was then one who had tried it with ſucceſs. The ſecret conſiſted in a couple of large thin hollow copper-globes, exhauſted of air; which being much lighter than air, would ſuſtain a chair whereon a perſon might ſit. Fa. Franciſco Lana, in his *Prodromo*, propoſes the ſame thing, as his own thought. He computes, that a round veſſel of plate-braſs, 14 feet in diameter, weighing three ounces the ſquare foot, will only weigh 1848 ounces; whereas a quantity of air of the ſame bulk will weigh 2155$\frac{1}{2}$d ounces; ſo that the globe will not only be ſuſtained in the air, but will carry with it a weight of 373$\frac{1}{2}$d ounces; and by increaſing the bulk of the globe, without increaſing the thickneſs of the metal, he adds, a veſſel might be made to carry a much greater weight.—But the fallacy is obvious: a globe of the dimenſions he deſcribes, Dr Hook ſhows, would not ſuſtain the preſſure of the air, but be cruſhed inwards. Beſides, in whatever ratio the bulk of the globe were increaſed, in the ſame muſt the thickneſs of the metal, and conſequently the weight be increaſed: ſo that there would be no advantage in ſuch augmentation. See AEROSTATION. Flying Foenus.

The ſame author deſcribes an engine for flying, invented by the Sieur Beſnier, a ſmith of Sable, in the county of Main. *Vid. Philoſoph. Collect.* N° 1.

The philoſophers of king Charles the ſecond's reign were mightily buſied about this art. The famous biſhop Wilkins was ſo confident of ſucceſs in it, that he ſays, he does not queſtion but in future ages it will be as uſual to hear a man call for his wings, when he is going a journey, as it is now to call for his boots.

FLYING-Bridge. See BRIDGE.

FLYING-Fiſh, a name given by the Engliſh writers to ſeveral ſpecies of fiſh, which by means of their long fins, have a method of keeping themſelves out of water a conſiderable time. See EXOCOETUS.

FLYING-Pinion, is part of a clock, having a fly or fan whereby to gather air, and ſo bridle the rapidity of the clock's motion, when the weight deſcends in the ſtriking part.

FO, or FOE; an idol of the Chineſe. He was originally worſhipped in the Indies, and tranſported from thence into China, together with the fables with which the Indian books were filled. He is ſaid to have performed moſt wonderful things, which the Chineſe have deſcribed in ſeveral volumes, and repreſented by cuts.

Sect of Fo. See CHINA, n° 103.

Fo-Kien. See FOKIEN.

FOAL, or *COLT and FILLY*; the young of the horſe kind. The word *colt*, among dealers, is underſtood of the male, as *filly* is of the female. See COLT.

FOCUS, in geometry and conic ſections, is applied to certain points in the parabola, ellipſis, and hyperbola, where the rays reflected from all parts of theſe curves concur and meet. See *Conic Sections*.

FOCUS, in optics; a point in which any number of rays, after being reflected or refracted, meet.

FODDER, any kind of meat for horſes or other cattle. In ſome places, hay and ſtraw, mingled together, is peculiarly denominated *fodder*.

FODDER, in the civil law, is uſed for a prerogative that the prince has, to be provided of corn and other meats for his horſes, by the ſubjects, in his warlike expeditions.

FODDER, in mining, a meaſure containing 22 hundred and an half weight, though in London but 20 hundred weight.

FOENUGREEK, in botany. See TRIGONELLA.

FOENUS NAUTICUM. Where money was lent to a merchant, to be employed in a beneficial trade with condition to be repaid, with extraordinary intereſt, in caſe

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Foesius & Fog.

case such voyage was safely performed, the agreement was sometimes called *fœnus nauticum*, sometimes *usura maritima*. But as this gave an opening for usurious and gaming contracts, 19 Geo. II. c. 37. enacts, that all money lent on bottomry, or at *respondentia*, on vessels bound to or from the East Indies, shall be expressly lent only upon the ship or merchandise: the lender to have the benefit of salvage, &c. *Blackst. Com.* II. 459. *Mol. de Jur. Mar.* 361.

FOESIUS (Anulius), a very learned and celebrated physician of the faculty of Paris, born at Mentz in 1528. He translated into Latin the whole works of Hippocrates, judiciously correcting the Greek text as he went along; and composed a kind of dictionary to him, intitled, *Oeconomia Hippocratis*. He translated, beside, the Commentaries of Galen upon the second book of Hippocrates; and was the author of some other works. After practising physic a long time with great success and reputation, at Lorrain and other places, he died in 1596.

FOETOR, in medicine, stinking or fetid effluvia arising from the body or any part thereof.

FOETUS, the young of all viviparous animals whilst in the womb, and of oviparous animals before being hatched: the name is transferred by botanists to the *embryos of vegetables*.

Strictly, the name is applied to the young after it is perfectly formed; till which time it is more properly called Embryo. See Anatomy, n° 109, 110.

In the human fœtus are several peculiarities not to be found in the adult; some of them are as follows. 1. The arteries of the navel-string, which are continuations of the hypogastics, are, after the birth, shrivelled up, and form the ligamenta umbilic. infer. 2. The veins of the navel-string are formed by the union of all the venous branches in the placenta, and passing into the abdomen become the falciform ligament of the liver. 3. The lungs, before being inflated with air, are compact and heavy, but after one inspiration they become light, and as it were spongy: and it may be noted here, that the notion of the lungs sinking in water before the child breathes, and of their swimming after the reception of air, are no certain proofs that the child had or had not breathed, much less that it was murdered: for the uninflated lungs become specifically lighter than water as soon as any degree of putrefaction takes place in them; and this soon happens after the death of the child: besides, where the utmost care hath been taken to preserve the child, it hath breathed once or twice, and then died. 6. The thymus gland is very large in the fœtus, but dwindles away in proportion as years advance. 7. The foramen ovale in the heart of a fœtus, is generally closed in an adult.

FOG, or Mist, a meteor, consisting of gross vapours, floating near the surface of the earth.

Mists, according to lord Bacon, are imperfect condensations of the air, consisting of a large proportion of the air, and a small one of the aqueous vapour: and these happen in the winter, about the change of the weather from frost to thaw, or from thaw to frost; but in the summer, and in the spring, from the expansion of the dew.

If the vapours, which are raised plentifully from the earth and waters, either by the solar or subterraneous heat, do at their first entrance into the atmosphere meet with cold enough to condense them to a considerable degree, their specific gravity is by that means increased, and so they will be stopped from ascending; and either return back in form of dew or of drizzling rain, or remain suspended some time in the form of a fog. Vapours may be seen on the high grounds as well as the low, but more especially about marshy places. They are easily dissipated by the wind, as also by the heat of the sun. They continue longest in the lowest grounds, because these places contain most moisture, and are least exposed to the action of the wind.

Fogage & Foil.

Hence we may easily conceive, that fogs are only low clouds, or clouds in the lowest region of the air; as clouds are no other than fogs raised on high. See Cloud.

When fogs stink, then the vapours are mixed with sulphureous exhalations, which smell so. Objects viewed through fogs appear larger and more remote than through the common air. Mr Boyle observes, that upon the coast of Coromandel, and most maritime parts of the East Indies, there are, notwithstanding the heat of the climate, annual fogs so thick, as to occasion people of other nations who reside there, and even the more tender sort of the natives, to keep their houses close shut up.

Fogs are commonly pretty strongly electrified, as appears from Mr Cavallo's observations upon them. See Electricity, n° 76.

FOGAGE, in the forest law, is rank grass not eaten up in summer.

FOGLIETA (Oberto or Hubert), a Genoese priest, and one of the most learned writers of the 16th century. He had a share in the disturbances that were raised at Genoa, for which he was banished; and died at Rome in 1581, aged 63. He wrote a history of Genoa in Italian, which is highly esteemed; and many works in Latin.

FOGO, or Fuego. See Fuego.

FOHI. See Fe; and China, n° 7.

FOIBLE, a French term, frequently used also in our language. It literally signifies *weak*; and in that sense is applied to the body of animals and the parts thereof, as *foible* reins, *foible* sight, &c. being derived from the Italian *fievole*, of the Latin *flebilis*, to be "lamented, pitied."

But it is chiefly used with us substantively, to denote a defect or flaw in a person or thing. Thus we say, Every person has his foible; and the great secret consists in hiding it artfully: Princes are gained by flattery, that is their foible: The foible of young people is pleasure; the foible of old men is avarice; the foible of the great and learned is vanity; the foible of women and girls, coquetry, or an affectation of having gallants: You should know the forte and the foible of a man before you employ him: We should not let people perceive that we know their foible.

FOIL, in fencing, denotes a blunt sword, or one that has a button at the end covered with leather, used in learning the art of fencing.

Foil, among glass-grinders, a sheet of tin, with quicksilver, or the like, laid on the backside of a looking-glass, to make it reflect. See Foliating.

Foil, among jewellers, a thin leaf of metal placed under

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Foil || Folard.

under a precious ſtone, in order to make it look tranſparent, and give it an agreeable different colour, either deep or pale: thus, if you want a ſtone to be of a pale colour, put a foil of that colour under it; or if you would have it deep, lay a dark one under it.

Theſe foils are made either of copper, gold, or gold and ſilver together. The copper foils are commonly known by the name of *Nuremberg* or *German foils*; and are prepared as follows: Procure the thinneſt copper-plates you can get: beat theſe plates gently upon a well-poliſhed anvil, with a poliſhed hammer, as thin as poſſible; and placing them between two iron-plates as thin as writing paper, heat them in the fire; then boil the foil in a pipkin, with equal quantities of tartar and ſalt, conſtantly ſtirring them till by boiling they become white; after which, taking them out and drying them, give them another hammering, till they are made fit for your purpoſe: however, care muſt be taken not to give the foils to much heat, for fear of melting; nor muſt they be too long boiled, for fear of attracting too much ſalt.

The manner of poliſhing theſe foils is as follows: Take a plate of the beſt copper, one foot long and about five or ſix inches wide, poliſhed to the greateſt perfection; bend this to a long convex, faſten it upon a half roll, and fix it to a bench or table; then take ſome chalk, waſhed as clean as poſſible, and filtred through a fine linen cloth, till it be as fine as you can make it; and having laid ſome thereof on the roll, and wetted the copper all over, lay your foils on it, and with a poliſhing ſtone and the chalk poliſh your foils till they are as bright as a looking-glaſs; after which they muſt be dried, and laid up ſecure from duſt.

FOKIEN, a province of China in Aſia, commodiouſly ſituated for navigation and commerce, part of it bordering on the ſea, in which they catch large quantities of fiſh, which they ſend ſalted to other parts of the empire. Its ſhores are very uneven, by reaſon of the number and variety of its bays; and there are many forts built thereon to guard the coaſt. The air is hot, but pure and wholeſome.

The mountains are almoſt every where diſpoſed into a kind of amphitheatres, by the labour of the inhabitants, with terraces placed one above another. The fields are watered with rivers and ſprings, which iſſue out of the mountains, and which the huſbandmen conduct in ſuch a manner as to overflow the fields of rice when they pleaſe, becauſe it thrives beſt in watery ground. They make uſe of pipes of bamboe for this purpoſe.

They have all commodities in common with the reſt of China; but more particularly muſk, precious ſtones, quickſilver, ſilk, hempen-cloth, callico, iron, and all ſorts of utenſils wrought to the greateſt perfection. From other countries they have cloves, cinnamon, pepper, ſandal-wood, amber, coral, and many other things. The capital city is Foutcheou Fou; or, as others would have it written, Fucherofu. But as for Fokien, which moſt geographers make the capital, Groſier informs us there is no ſuch place.

FOLARD (Charles), an eminent Frenchman, famous for his ſkill and knowledge in the art military, was born at Avignon in 1669, of a noble family, but not a rich one. He diſcovered an early turn for the ſciences, and a ſtrong paſſion for arms; which laſt was ſo inflamed by reading Cæſar's Commentaries, that he enliſted at 16 years of age. His father got him off, and ſhut him in a monaſtery: but he made his eſcape in about two years after, and entered himſelf a ſecond time in quality of cadet. His inclination for military affairs, and the great pains he took to accompliſh himſelf in that way, recommended him to notice; and he was admitted into the friendſhip of the firſt-rate officers. M. de Vendome, who commanded in Italy in 1720, made him his aid-de-camp, having conceived the higheſt regard for him; and ſoon after ſent him with part of his forces into Lombardy. He was entirely truſted by the commander of that army; and no meaſures were concerted, or ſteps taken, without conſulting him. By purſuing his plans, many places were taken, and advantages gained; and ſuch, in ſhort, were his ſervices, that he had a penſion of 400 livres ſettled upon him, and was honoured with the croſs of St Lewis. He diſtinguiſhed himſelf greatly, Auguſt 15. 1705, at the battle of Caſſano; where he received a wound upon his left hand, which deprived him of the uſe of it ever after. It was at this battle that he conceived the firſt idea of that ſyſtem of columns, which he afterwards prefixed to his Commentaries upon Polybius. The duke of Orleans ſending de Vendome again into Italy in 1706, Folard had orders to throw himſelf into Modena to defend it againſt Eugene: where, tho' he acquitted himſelf with his uſual ſkill, he was very near being aſſaſſinated. The deſcription which he has given of the conduct and character of the governor of this town, may be found in his Treatiſe of the Defence of Places, and deſerves to be read. He received a dangerous wound on the thigh at the battle of Malplaquet, and was ſome time after made priſoner by prince Eugene. Being exchanged in 1711, he was made governor of Bourbourg. In 1714 he went to Malta, to aſſiſt in defending that iſland againſt the Turks. Upon his return to France, he embarked for Sweden, having a paſſionate deſire to ſee Charles XII. He acquired the eſteem and confidence of that famous general, who ſent him to France to negociate the reeſtabliſhment of James II. upon the throne of England; but that project being dropped, he returned to Sweden, followed Charles XII. in his expedition to Norway, and ſerved under him at the ſiege of Frederickſhall, where that prince was killed, Dec. 11. 1718. Folard then returned to France; and made his laſt campaign in 1719, under the duke of Berwick, in quality of colonel. From that time he applied himſelf intenſely to the ſtudy of the art military as far as it could be ſtudied at home; and built his theories upon the foundation of his experience and obſervations on facts. He contracted an intimacy with count Saxe, who, as he then declared, would one day prove a very great general. He was choſen a fellow of the Royal Society at London in 1749; and, in 1751, made a journey to Avignon, where he died in 1752, aged 83 years. He was the author of ſeveral works, the principal of which are, 1. Commentaries upon Polybius, in ſix volumes, 4to. 2. A Book of new Diſcoveries in War. 3. A Treatiſe concerning the Defence of Places, &c. in French. Thoſe who would know more of this eminent ſoldier, may conſult a French piece, intitled,

Folard.

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Folc-lands || Folengio.

titled, *Memoires pours ſervir á l'Hiſtoire de M. de Chevalier de Folard. Ratiſbone*, 1753, 12mo.

FOLC-LANDS, (Sax.) copy-hold lands ſo called in the time of the Saxons, as charter-lands were called *boc-lands*, Kitch. 174. *Folkland* was *terra vulgi* or *popularis*; the land of the vulgar people, who had no certain eſtate therein, but held the ſame, under the rents and ſervices accuſtomed or agreed, at the will only of their lord the thane; and it was therefore not put in writing, but accounted *prædium ruſticum et ignobile*. Spelm. of Feuds, *c.* 5.

FOLCMOTE, or FOLKMOTE, (Sax. *Folcgemot*, i. e. *conventus populi*), is compounded of *folk*, *populus*, and *mote*, or *gemote*, *convenire*; and ſignified originally, as Somner in his Saxon Dictionary informs us, a general aſſembly of the people, to conſider of and order matters of the commonwealth. And Sir Henry Spelman ſays, the *folcmote* was a ſort of annual parliament, or convention of the biſhops, thanes, aldermen, and freemen, upon every May-day yearly; where the laymen were ſworn to defend one another and the king, and to preſerve the laws of the kingdom; and then conſulted of the common ſafety. But Dr Brady infers from the laws of the Saxon kings of England, that it was an inferior court, held before the king's *reeve* or ſteward, every month, to do *folk* right, or compoſe ſmaller differences, from whence there lay appeal to the ſuperior courts; *Gloſs.* p. 48. Squire ſeems to think the *folcmote* not diſtinct from the *ſhiremote*, or common general meeting of the county. See his *Angl. Sax. Gov.* 155. *n.*

Manwood mentions *folcmote* as a court holden in London, wherein all the *folk* and people of the city did complain of the mayor and aldermen, for miſgovernment within the ſaid city; and this word is ſtill in uſe among the Londoners, and denotes *celebrem ex tota civitate conventum*. *Stow's Survey*. According to Kennet, the *folcmote* was a common-council of all the inhabitants of a city, town, or borough, convened often by ſound of bell, to the *Mote Hall*, or *Houſe*; or it was applied to a larger congreſs of all the freemen within a county, called the *ſhire-mote*, where formerly all knights and military tenants did fealty to the king, and elected the annual ſheriff on the 1ſt of October; till this popular election, to avoid tumults and riots, devolved to the king's nomination, anno 1315, 3 Edw. 1. After which the city *folkmote* was ſwallowed up in a ſelect committee or common-council, and the country *folkmote* in the ſheriff's tourn and aſſiſes.

The word *folkmote* was alſo uſed for any kind of popular or public meeting; as of all the tenants at the *court-leet*, or *court-baron*, in which ſignification it was of a leſs extent. *Paroch. Antiq.* 120.

FOLENGIO (Theophilus), of Mantua, known alſo by the title of *Merlin Coccaye*, an Italian poet, remarkable for giving to a poem a name which has been adopted ever ſince for all trifling performances of the ſame ſpecies, conſiſting of buffoonry, puns, anagrams, wit without wiſdom, and humour without good-ſenſe. His poem was called *The Macaroni*, from an Italian cake of the ſame name, which is ſweet to the taſte, but has not the leaſt alimentary virtue, on the contrary palls the appetite and cloys the ſtomach. Theſe idle poems, however, became the reigning taſte in Italy and in France: they gave birth to macaroni academies; and, reaching England, to macaroni clubs; till, in the end, every thing inſipid, contemptible, and ridiculous, in the character, dreſs, or behaviour, of both men and women, is now ſummed up in the deſpicable appellation of *a macaroni*. Folengio died in 1544.

Folia || Folio.

FOLIA, among botaniſts, particularly ſignify the leaves of plants; thoſe of flowers being expreſſed by the word *petals*. See LEAF.

FOLIAGE, a cluſter or aſſemblage of flowers, leaves, branches, &c.

FOLIAGE, is particularly uſed for the repreſentations of ſuch flowers, leaves, branches, rinds, &c. whether natural or artificial, as are uſed for enrichments on capitals, friezes, pediments, &c.

FOLIATING *of* LOOKING-GLASSES, the ſpreading the plates over, after they are poliſhed, with quick-ſilver, &c. in order to reflect the image. It is performed thus: A thin blotting paper is ſpread on the table, and ſprinkled with fine chalk; and then a fine lamina or leaf of tin, called *foil*, is laid over the paper; upon this is poured mercury, which is to be diſtributed equally over the leaf with a hare's-foot or cotton: over this is laid a clean paper, and over that the glaſs-plate, which is preſſed down with the right-hand, and the paper drawn gently out with the left: this being done, the plate is covered with a thicker paper, and loaded with a greater weight, that the ſuperfluous mercury may be driven out and the tin adhere more cloſely to the glaſs. When it is dried, the weight is removed, and the looking-glaſs is complete.

Some add an ounce of marcaſite, melted by the fire; and, leſt the mercury ſhould evaporate in ſmoke, they pour it into cold water; and when cooled, ſqueeze through a cloth, or through leather.

Some add a quarter of an ounce of tin and lead to the marcaſite, that the glaſs may dry the ſooner.

FOLIATING *of Globe Looking-glaſſes*, is done as follows: Take five ounces of quickſilver and one ounce of biſmuth; of lead and tin, half an ounce each: firſt put the lead and tin into fuſion, then put in the biſmuth; and when you perceive that in fuſion too, let it ſtand till it is almoſt cold, and pour the quickſilver into it: after this, take the glaſs-globe, which muſt be very clean, and the inſide free from duſt: make a paper-funnel, which put into the hole of the globe, as near the glaſs as you can, ſo that the amalgam, when you pour it in, may not ſplaſh, and cauſe the glaſs to be full of ſpots; pour it in gently, and move it about, ſo that the amalgam may touch every where: if you find the amalgam begin to be curdly and fixed, then hold it over a gentle fire, and it will eaſily flow again; and if you find the amalgam too thin, add a little more lead, tin, and biſmuth to it. The finer and clearer your globe is, the better will the looking-glaſs be.

Dr Shaw obſerves, that this operation has conſiderable advantages, as being performable in the cold; and that it is not attended with the danger of poiſonous fumes from arſenic, or other unwholeſome matters, uſually employed for this purpoſe: beſides, how far it is applicable to the more commodious foliating of the common looking-glaſſes, and other ſpeculums, he thinks, may deſerve to be conſidered.

FOLIO, in merchants books, denotes a page, or rather both the right and left hand pages, theſe being

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Folio
||
Folfis.

expreſſed by the ſame figure, and correſponding to each other. See BOOK-KEEPING.

FOLIO, among printers and bookſellers, the largeſt form of books, when each ſheet is ſo printed that it may be bound up in two leaves only.

FOLIS. See FOLLIS.

FOLIUM, or LEAF, in botany. See LEAF.

FOLKES (Martin), an Engliſh antiquary, mathematician, and philoſopher, was born at Weſtminſter about 1690; and was greatly diſtinguiſhed as a member of the Royal Society in London, and of the Academy of Sciences at Paris. He was admitted into the former at 24 years of age; made one of their council two years after; named by Sir Iſaac Newton himſelf as vice-preſident; and, after Sir Hans Sloane, became preſident. There are numerous Memoirs of his in the Philoſophical Tranſactions. Coins, ancient and modern, were a great object with him; and his laſt production was a book upon the Engliſh Silver Coin, from the conqueſt to his own times. He died at London in 1754. Dr Birch had drawn up materials for a life of Mr Folkes, which are preſerved at large in the Anecdotes of Bowyer, p. 562. *et ſeq.*

FOLKESTONE, a town of Kent, between Dover and Hythe, 72 miles from London, appears to have been a very ancient place, from the Roman coins and Britiſh bricks often found in it. Stillingfleet and Tanner take it for the *Lapis Tituli* of Nennius. It was burnt by Earl Godwin, and by the French in the reign of Edward III. It had five churches, now reduced to one. It is a member of the town and port of Dover; and has a weekly market and an annual fair. It is chiefly noted for the multitude of fiſhing-boats that belong to its harbour, which are employed in the ſeaſon in catching mackerel for London; to which they are carried by the mackerel-boats of London and Barking. About Michaelmas, the Folkeſtone-barks, with others from Suſſex, go away to the Suffolk and Norfolk coaſts, to catch herrings for the merchants of Yarmouth and Leoſtoff.—Folkeſtone gives title of *Viſcount* to William Henry Bouverie, whoſe grandfather, Jacob, was ſo created in 1747. It has been obſerved of ſome hills in this neighbourhood, that they have viſibly ſunk and grown lower within memory.

FOLKLAND, and FOLKMOTE. See FOLCLAND.

FOLLICULUS, (from *follis*, "a bag,") a ſpecies of ſeed-veſſel firſt mentioned by Linnæus in his *Delineatio plantæ*, generally conſiſting of one valve, which opens from bottom to top on one ſide, and has no ſuture for faſtening or attaching the ſeeds within it.

FOLLICULI are likewiſe defined by the ſame author to be ſmall glandular veſſels diſtended with air, which appear on the ſurface of ſome plants; as at the root of water-milfoil, and on the leaves of aldrovanda. In the former, the veſſels in queſtion are roundiſh, and furniſhed with an appearance like two horns; in the latter, pot-ſhaped, and ſemicircular.

FOLLIS, or FOLIS, anciently ſignified a little bag or purſe; whence it came to be uſed for a ſum of money, and very different ſums were called by that name: thus the ſcholiaſt on the Baſilics, mentions a follis of copper which was worth but the 24th part of the miliarenſis; the gloſſæ nomicæ, quoted by Gronovius and others, one of 125 miliarenſis, and another of 250 denarii, which was the ancient ſeſtertium; and three different ſums of eight, four, and two pound of gold, were each called *follis*. According to the account of the ſcholiaſt, the ounce of ſilver, which contained 5 miliarenſis of 60 in the pound, was worth 120 follis of copper. The gloſſographer, deſcribing a follis of 250 denarii, ſays it was equal to 312 pounds 6 ounces of copper; and as the denarius of that age was the 8th part of an ounce, an ounce of ſilver muſt have been worth 120 ounces of copper; and therefore the ſcholiaſt's follis was an ounce of copper, and equal to the gloſſographer's nummus. But as Conſtantine's copper money weighed a quarter of a Roman ounce, the ſcholiaſt's follis and the gloſſographer's nummus contained four of them, as the ancient nummus contained four aſſes.

Fly
Fong-yang

FOLLY, according to Mr Locke, conſiſts in the drawing of falſe concluſions from juſt principles; by which it is diſtinguiſhed from madneſs, which draws juſt concluſions from falſe principles.

But this ſeems too confined a definition; *folly*, in its moſt general acceptation, denoting a weakneſs of intellect or apprehenſion, or ſome partial abſurdity in ſentiment or conduct.

FOMAHANT, in aſtronomy, a ſtar of the firſt magnitude in the conſtellation AQUARIUS.

FOMENTATION, in medicine, is a fluid externally applied, uſually as warm as the patient can bear it, and in the following manner. Two flanel cloths are dipped into the heated liquor, one of which is wrung as dry as the neceſſary ſpeed will admit, then immediately applied to the part affected; it lies on until the heat begins to go off, and the other is in readineſs to apply at the inſtant in which the firſt is removed: thus theſe flanels are alternately applied, ſo as to keep the affected part conſtantly ſupplied with them warm. This is continued 15 or 20 minutes, and repeated two or three times a-day.

Every intention of relaxing and ſoothing by fomentations may be anſwered as well by warm water alone as when the whole tribe of emollients are boiled in it; but when diſcutients or antiſeptics are required, ſuch ingredients muſt be called in as are adapted to that end.

The degree of heat ſhould never exceed that of producing a pleaſing ſenſation; great heat produces effects very oppoſite to that intended by the uſe of fomentations.

FONG-YANG, a city of China, in the province of KIANG-*Nan*. It is ſituated on a mountain, which hangs over the yellow river, and incloſes with its walls ſeveral fertile little hills. Its juriſdiction is very extenſive: for it comprehends 18 cities; 5 of which are of the ſecond, and 13 of the third claſs. As this was the birth-place of the emperor Hong-vou, chief of the preceding dynaſty, this prince formed a deſign of rendering it a famous and magnificent city, in order to make it the ſeat of empire. After having expelled the weſtern Tartars, who had taken poſſeſſion of China, he transferred his court hither, and named the city *Fong-yang*; that is to ſay, "The Place of the Eagle's Splendor." His intention, as we have ſaid, was to beautify and enlarge it; but the inequality of the ground, the ſcarcity of freſh water, and above all the vicinity of his father's tomb, made him change his deſign. By the

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Fong-yang
Fontaine

the unanimous advice of his principal officers, this prince eſtabliſhed his court at NAN-KING, a more beautiful and commodious place. When he had formed this reſolution, a ſtop was put to the intended works: the imperial palace which was to have been incloſed by a triple wall, the walls of the city to which a circumference of nine leagues were aſſigned, and the canals that were begun, all were abandoned; and nothing was finiſhed but three monuments, which ſtill remain. The extent and magnificence of theſe ſufficiently ſhow what the beauty of this city would have been, had the emperor purſued his original deſign. The firſt is the tomb of the father of Hong-vou, to decorate which no expence was ſpared; it is called *Hoan-lin*, or the *Royal Tomb*. The ſecond is a tower built in the middle of the city, which is of an oblong form, and 100 feet high. The third is a magnificent temple erected to the god Fo. At firſt it was only a pagod, to which Hong-vou retired after having loſt his parents, and where he was admitted as an inferior domeſtic; but, having ſoon become weary of this kind of life, he enliſted with the chief of a band of banditti, who had revolted from the Tartars. As he was bold and enterpriſing, the general made choice of him for his ſon-in-law; ſoon after, he was declared his ſucceſſor by the unanimous voice of the troops. The new chief, ſeeing himſelf at the head of a large party, had the preſumption to carry his views to the throne. The Tartars, informed of the progreſs of his arms, ſent a numerous army into the field: but he ſurpriſed and attacked them with ſo much impetuoſity, that they were obliged to fly; and, though they ſeveral times returned to the charge, they were ſtill defeated, and at length driven entirely out of China. As ſoon as he mounted the throne, he cauſed the ſuperb temple which we have mentioned, to be raiſed out of gratitude to the Bonzes, who had received him in his diſtreſs, and aſſigned them a revenue ſufficient for the maintenance of 300 perſons, under a chief of their own ſect, whom he conſtituted a mandarin, with power of governing them, independent of the officers of the city. This pagod was ſupported as long as the preceding dynaſty laſted; but that of the eaſtern Tartars, which ſucceeded, ſuffered it to fall to ruin.

FONG-Choui, the name of a ridiculous ſuperſtition among the Chineſe. See CHINA, n° 105.

FONT, among eccleſiaſtical writers, a large baſon, in which water is kept for the baptizing of infants or other perſons.

FONT, in the art of printing, denotes a complete aſſortment of letters, accents, &c. uſed in printing. See FOUNT.

FONTAINE (John), the celebrated French poet, and one of the firſt rate geniuſes of his age, was born at Chateau Thierri in Champaigne, the 8th of July 1621, of a good extraction. At the age of 19 he entered amongſt the Oratorians, but quitted that order 18 months after. He was 22 years of age before he knew his own talents for poetry; but hearing an ode of Malherbe read, upon the aſſaſſination of Henry IV. he was ſo taken with admiration of it, that the poetical fire, which had before lain dormant within him, ſeemed to be enkindled from that of the other great poet. He applied himſelf to read, to meditate, to repeat, in fine, to imitate, the works of Malherbe. The firſt eſſays of his pen he confined to one of his relations, who made him read the beſt Latin authors, Horace, Virgil, Terence, Quintilian, &c. and then the beſt compoſitions in French and Italian. He applied himſelf likewiſe to the ſtudy of the Greek authors, particularly Plato and Plutarch. Some time afterwards his parents made him marry a daughter of a lieutenant-general, a relation of the great Racine. This young lady, beſides her very great beauty, was remarkable for the delicacy of her wit, and Fontaine never compoſed any work without conſulting her. But as her temper was none of the beſt, to avoid diſſenſion, he ſeparated himſelf from her company as often as he well could. The famous ducheſs of Bouillon, niece to cardinal Mazarine, being exiled to Chateau Thierri, took particular notice of Fontaine. Upon her recal, he followed her to Paris; where, by the intereſt of one of his relations, he got a penſion ſettled upon him. He met with great friends and protectors amongſt the moſt diſtinguiſhed perſons of the court, but madam de la Sabliere was the moſt particular. She took him to live at her houſe; and it was then that Fontaine, diveſted of domeſtic concerns, led a life conformable to his diſpoſition, and cultivated an acquaintance with all the great men of the age. It was his cuſtom, after he was fixed at Paris, to go every year, during the month of September, to his native place of Chateau-Thierri, and pay a viſit to his wife, carrying with him Racine, Deſpreaux, Chapelle, or ſome other celebrated writers. When he has ſometimes gone thither alone by himſelf, he has come away without remembering even to call upon her; but ſeldom omitted ſelling ſome part of his lands, by which means he ſquandered away a conſiderable fortune. After the death of madame de la Sabliere, he was invited into England, particularly by madame Mazarin, and by St Evremond, who promiſed him all the ſweets and comforts of life; but the difficulty of learning the Engliſh language, and the liberality of the duke of Burgundy, prevented his voyage.

Fontaine.

About the end of the year 1692 he fell dangerouſly ill; and, as is cuſtomary upon theſe occaſions in the Romiſh church, he made a general confeſſion of his whole life to P. Poguet, an oratorian; and, before he received the ſacrament, he ſent for the gentlemen of the French academy, and in their preſence declared his ſincere compunction for having compoſed his Tales; a work he could not reflect upon without the greateſt repentance and deteſtation; promiſing, that if it ſhould pleaſe God to reſtore his health, he would employ his talents only in writing upon matters of morality or piety. He ſurvived this illneſs two years, living in the moſt exemplary and edifying manner, and died the 13th of March 1695, being 74 years of age. When they ſtripped his body, they found next his ſkin a hair-ſhirt; which gave room for the following expreſſion of the younger Racine:

Et l'Auteur de Jaconde eſt orme d'un Cilice.

Fontaine's character is remarkable for a ſimplicity, candour, and probity, ſeldom to be met with. He was of an obliging diſpoſition; cultivating a real friendſhip with his brother poets and authors; and, what is very rare, beloved and eſteemed by them all. His converſation was neither gay nor brilliant, eſpecially when he was not among his intimate friends. One

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Fontaine, Fontainbleau.

day being invited to dinner at a farmer-general's, he eat a great deal, but did not ſpeak. Riſing up from table very early, under pretext of going to the academy, one of the company repreſented to him that it was not yet a proper time: "Well (ſays he), if it is not, I will ſtay a little longer." He had one ſon by his wife in the year 1660. At the age of 14, he put him into the hands of M. de Harley, the firſt preſident, recommending to him his education and fortune. It is ſaid, that having been a long time without ſeeing him, he happened to meet him one day viſiting, without recollecting him again, and mentioned to the company that he thought that young man had a good deal of wit and underſtanding. When they told him it was his own ſon, he anſwered in the moſt tranquil manner, "Ha! truly I am glad on't" An indifference, or rather an abſence of mind, influenced his whole conduct, and rendered him often inſenſible to the inclemency of the weather. Madame de Bouillon going one morning to Verſailles, ſaw him, abſtracted in thought, ſitting in an arbour; returning at night, ſhe found him in the ſame place, and in the ſame attitude, although it was very cold and had rained almoſt the whole day. He carried this ſimplicity ſo far, that he was ſcarce ſenſible of the bad effects ſome of his writings might occaſion, particularly his tales. In a great ſickneſs, his confeſſor exhorting him to prayer and almsdeeds: "As for alms-deeds (replied Fontaine), I am not able, having nothing to give; but they are about publiſhing a new edition of my Tales, and the bookſeller owes me a hundred copies; you ſhall have them to ſell, and diſtribute their amount amongſt the poor." Another time P. Poguet exhorting him to repent of his faults, "If he has committed any (cried the nurſe), I am ſure it is more from ignorance than malice, for he has as much ſimplicity as an infant." One time having compoſed a tale, wherein he made a profane application of thoſe words of the Goſpel, "Lord, five talents thou didſt deliver to me," he dedicated it, by a moſt ingenious prologue, to the celebrated Arnauld, telling him, it was to ſhow to poſterity the great eſteem he had for the learned doctor. He was not ſenſible of the indecency of the dedication, and the profane application of the text, till Boileau and Racine repreſented it to him. He addreſſed another, by a dedication in the ſame manner to the archbiſhop of Paris. His Fables are an immortal work, exceeding every thing in that kind, both ancient and modern, in the opinion of the learned. People of taſte, the oftener they read them, will find continually new beauties and charms, not to be met with elſewhere. The deſcendants of this great poet are exempted in France from all taxes and impoſitions, a privilege which the intendants of Soiſſons to this day think it an honour to confirm to them.

FONTAINBLEAU, a town in the Iſle of France, and in the Gatinois, remarkable for its fine palace, which has been the place where the kings of France uſed to lodge when they went a-hunting. It was firſt embelliſhed by Francis I. and all the ſucceſſive kings have added ſomething thereto; inſomuch that it may now be called the fineſt pleaſure-houſe in the world. It ſtands in the midſt of a foreſt, conſiſting of 26,424 arpents of land, each containing 100 ſquare perches, and each perch 18 feet. E. Long. 2. 33. N. Lat. 40. 22.

Fontaines || Fontarabia.

FONTAINES (Peter Francis), a French critic, was born of a good family at Rouen in 1685. At 15, he entered into the ſociety of the Jeſuits; and at 30, quitted it, for the ſake of returning to the world. He was a prieſt, and had a cure in Normandy; but left it, and was, as a man of wit and letters, ſome time with the cardinal d'Auvergne. Having excited ſome attention at Paris by certain critical productions, the Abbé Bignon in 1724 committed to him the *Journal des Sçavans*. He acquitted himſelf well in this department, and was peaceably enjoying the applauſes of the public, when his enemies, whom by critical ſtrictures in his Journal he had made ſuch, formed an accuſation againſt him of a moſt abominable crime, and procured him to be impriſoned. By the credit of powerful friends, he was ſet at liberty in 15 days: the magiſtrate of the police took upon himſelf the trouble of juſtifying him in a letter to the Abbé Bignon; and this letter having been read amidſt his fellow-labourers in the Journal, he was unanimouſly re-eſtabliſhed in his former credit. This happened in 1725. But with whatever repute he might acquit himſelf in this Journal, frequent diſguſts made him frequently abandon it. He laboured mean while in ſome new periodical works, from which he derived his greateſt fame. In 1731, he began one under the title of *Nouvelliſte du Parnaſſe, ou Reflexions ſur les Ouvrages nouveaux:* but only proceeded to two volumes; the work having been ſuppreſſed by authority, from the inceſſant complaints of authors ridiculed therein. About three years after, in 1735, he obtained a new privilege for a periodical production, intitled, *Obſervations ſur les Ecrits Modernes;* which, after continuing to 33 volumes, was ſuppreſſed again in 1743. Yet the year following, 1744, he publiſhed another weekly paper, called. *Judgmens ſur les Ouvrages nouveaux*, and proceeded to 11 volumes: the two laſt being done by other hands. In 1745, he was attacked with a diſorder in the breaſt, which ended in a dropſy that proved fatal in five weeks. "He was (ſays M. Freron) born a ſentimental perſon; a philoſopher in conduct as well as in principle; exempt from ambition; and of a noble firm ſpirit, which would not ſubmit to ſue for preferments or titles. In common converſation he appeared only a common man; but when ſubjects of literature, or any thing out of the ordinary way, were agitated, he diſcovered great force of imagination and wit." Beſides the periodical works mentioned above, he was the author of many others: his biographer gives us no leſs than 17 articles; many of them critical, ſome hiſtorical, and ſome tranſlations from Engliſh writers, chiefly from Pope, Swift, Fielding, &c. The Abbé de la Porte, publiſhed, in 1757, *L'Eſprit de l'Abbé des Fontaines*, in 4 vols 12mo; prefixed to which is the Life of Fontaines, a catalogue of his works, and another catalogue of writings againſt him.

FONTANELLA, in anatomy, imports the quadrangular aperture found betwixt the os frontis and oſſa ſincipitis, in children juſt born; which is alſo called *fons pulſatilis*.

FONTARABIA, a ſea-port town of Spain in Biſcay, and in the territory of Guipuſcoa, ſeated on a peninſula on the ſea-ſhore, and on the river Bidaſſoa. It is ſmall, but well fortified both by nature and art; and has a good harbour, though dry at low water. It is-

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Fontenay ‖ Fontevraud.

is built in the form of an amphitheatre, on the declivity of an hill, and ſurrounded on the land ſide by the high Pyrenean mountains. It is a very important place, being accounted the key of Spain on that ſide. W. Long. 1. 43. N. Lat. 43. 23.

FONTENAY, (John Baptiſt Blain de), a very famous painter of fruit and flowers, was born at Caen in 1654. Louis XIV. gave him a penſion, and an apartment in the galleries of the Louvre; and he was nominated counſellor of the Academy of Painting. His fruit and flowers have all the freſhneſs and beauty of nature; the very dew ſeems to trickle down their ſtalks, with all the luſtre and tranſparency of the diamond, while the inſects upon them ſeem perfectly alive and animated. This ingenious painter died at Paris in 1715.

FONTENELLE, (Bernard de), a celebrated French author, was born in 1657, and died in 1756, when he was near 100 years old. He diſcharged the truſt of perpetual ſecretary to the Academy of Sciences above 40 years with univerſal applauſe; and his Hiſtory of the Academy of Sciences throws a great light upon their memoirs, which are very obſcure. The eloges which he pronounced on the deceaſed members of the academy, have this peculiar merit, that they excite a reſpect for the ſciences as well as for the author. In his poetical performances, and the Dialogues of the Dead, the ſpirit of Voiture was diſcernible, though more extended and more philoſophical. His Plurality of Worlds, is a work ſingular in its kind: the deſign of which was to preſent that part of philoſophy to view in a gay and pleaſing dreſs. In his more advanced years, he publiſhed comedies, which, though they ſhowed the elegance of Fontenelle, were little fitted for the ſtage; and An Apology for Des Cartes's Vortices. M. de Voltaire, who declares him to have been the moſt univerſal genius the age of Louis XIV. produced, ſays, "We muſt excuſe his comedies, on account of his great age; and his Carteſian opinions, as they were thoſe of his youth, when they were univerſally received all over Europe."

FONTENOY, a town or village of the Auſtrian Netherlands, in the province of Hainault, and on the borders of Flanders; remarkable for a battle fought there between the allies and the French on the firſt of May 1745. The French were commanded by Mareſchal Saxe, and the allies by the Duke of Cumberland. The latter behaved with great bravery; but through the ſuperiority of the numbers of the French army, and likewiſe the ſuperior generalſhip of their commander, the allies were defeated with great ſlaughter. The Britiſh troops behaved with aſtoniſhing intrepidity, as their enemies themſelves owned. It is even ſaid, that the battle was loſt through the cowardice of the Dutch, who failed in their attack on the village of Fontenoy, on which the event of the day depended. E. Long. 2. 20. N. Lat. 50. 35.

FONTENOY, a village of France, in the duchy of Burgundy, remarkable for a bloody battle fought there in 841, between the Germans and the French, in which were killed above 100,000 men; and the Germans were defeated. E. Long. 3. 48. N. Lat. 47. 28.

FONTEVRAUD, or FRONTEVAUX (Order of), in eccleſiaſtical hiſtory, a religious order inſtituted by Robert d'Arbriſſel, about the latter end of the 11th century, and taken under the protection of the holy ſee by pope Paſcal II. in 1106, confirmed by a bull in 1113, and inveſted by his ſucceſſors with very extraordinary privileges. The chief of this order is a female, who is appointed to inſpect both the monks and nuns. The order is divided into four provinces, which are thoſe of France, Aquitaine, Auvergne, and Bretagne, in each of which they have ſeveral priories.

Fonticulus ‖ Food.

FONTICULUS, or FONTANELLA, in ſurgery, an iſſue, ſeton, or ſmall ulcer, made in various parts of the body, in order to eliminate the latent corruption out of it.

FONTINALIA, or FONTANALIA, in antiquity, a religious feaſt held among the Romans in honour of the deities who preſided over fountains or ſprings. Varro obſerves, that it was the cuſtom to viſit the wells on thoſe days, and to caſt crowns into fountains. Scaliger, in his conjectures on Varro, takes this not to be a feaſt of fountains in general, as Feſtus inſinuates, but of the fountain which had a temple at Rome, near the Porta Capena, called alſo *Porta Fontinalis*: he adds, that it is of this fountain Cicero ſpeaks in his ſecond book *De legib.* The fontinalia were held on the 13th of October.

FONTINALIS, WATER-MOSS, in botany: A genus of the natural order of muſci, belonging to the cryptogamia claſs of plants. The anthera is hooded; the calyptra, or covering of the anthera, ſeſſile, incloſed in a perichætium or empalement of leaflets different from thoſe of the reſt of the plant. There are four ſpecies, all of them natives of Britain. They grow on the brinks of rivulets, and on the trunks of trees. The moſt remarkable is the antipyretica, with purple ſtalks. The Scandinavians line the inſides of their chimneys with this moſs, to defend them againſt the fire; for, contrary to the nature of all other moſs, this is ſcarcely capable of burning.

FOOD, in the moſt extenſive ſignification of the word, implies whatever aliments are taken into the body, whether ſolid or fluid; but, in common language, it is generally uſed to ſignify only the ſolid part of our aliment.

We are told, that in the firſt ages men lived upon acorns, berries, and ſuch fruits as the earth ſpontaneouſly produces; then they proceeded to eat the fleſh of wild animals taken in hunting: But their numbers decreaſing and mankind multiplying, neceſſity taught them the art of cultivating the ground, to ſow corn, &c. By and by they began to aſſign to each other, by general conſent, portions of land to produce them their ſupply of vegetables; after this, reaſon ſuggeſted the expedient of domeſticating certain animals, both to aſſiſt them in their labours and ſupply them with food. Hogs were the firſt animals of the domeſtic kind that appeared upon their tables; they held it to be ungrateful to devour the beaſts that aſſiſted them in their labours.—When they began to make a free uſe of domeſtic animals, they roaſted them only; boiling was a refinement in cookery which for ages they were ſtrangers to; and fiſh living in an element men were unuſed to, were not eaten till they grew ſomewhat civilized. Menelaus complains, in the Odyſſey, that they had been conſtrained to feed upon them.

The moſt remarkable diſtinction of foods, in a medical view, is into thoſe which are already aſſimilated into

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Food. into the animal nature, and ſuch as are not. Of the firſt kind are animal ſubſtances in general; which if not entirely ſimilar, are nearly ſo, to our nature. The ſecond comprehends vegetables, which are much more difficultly aſſimilated. But as the nouriſhment of all animals, even thoſe which live on other animals, can be traced originally to the vegetable kingdom, it is plain, that the principle of all nouriſhment is in vegetables.

Cullen on the Mat. Med. 1ſt edit.

Though there is perhaps no vegetable which does not afford nouriſhment to ſome ſpecies of animals or other; yet, with regard to mankind, a very conſiderable diſtinction is to be made. Thoſe vegetables which are of a mild, bland, agreeable taſte, are proper nouriſhment; while thoſe of an acrid, bitter, and nauſeous nature, are improper. We uſe, indeed, ſeveral acrid ſubſtances as food; but the mild, the bland, and agreeable, are in the largeſt proportion in almoſt every vegetable. Such as are very acrid, and at the ſame time of an aromatic nature, are not uſed as food, but as ſpices or condiments, which anſwer the purpoſes of medicine rather than any thing elſe. Sometimes, indeed, acrid and bitter vegetables ſeem to be admitted as food. Thus celeri and endive are uſed in common food, though both are ſubſtances of conſiderable acrimony; but it muſt be obſerved, that, when we uſe them, they are previouſly blanched, which almoſt totally deſtroys their acrimony. Or if we employ other acrid ſubſtances, we generally, in a great meaſure, deprive them of their acrimony by boiling. In different countries the ſame plants grow with different degrees of acrimony. Thus, garlic here ſeldom enters our food; but in the ſouthern countries, where the plants grow more mild, they are frequently uſed for that purpoſe. The plant which furniſhes caſſada, being very acrimonious, and even poiſonous, in its recent ſtate, affords an inſtance of the neceſſity of preparing acrid ſubſtances even in the hot countries: and there are other plants, ſuch as arum-root, which are ſo exceedingly acrimonious in their natural ſtate, that they cannot be ſwallowed with ſafety; yet, when deprived of that acrimony, will afford good nouriſhment.

The moſt remarkable properties of different vegetable ſubſtances as food, are taken notice of under their different names; here we ſhall only compare vegetable foods in general with thoſe of the animal kind.

I. *In the Stomach*, they differ remarkably, in that the vegetables always have a tendency to acidity, while animal food of all kinds tend rather to alkaleſcency and putrefaction. Some animal foods, indeed, turn manifeſtly acid before they putrify; and it has been aſſerted, that ſome degree of aceſcency takes place in every kind of animal food before digeſtion. This aceſcency of animal food, however, never comes to any morbid degree, but the diſeaſe is always on the ſide of putreſcency. The aceſcency of vegetables is more frequent, and ought to be more attended to, than the alkaleſcency of animal food; which laſt, even in weak ſtomachs, is ſeldom felt; while aceſcency greatly affects both the ſtomach and ſyſtem.

With regard to their difference of *ſolution*:—Heavineſs, as it is called, is ſeldom felt from vegetables, except from tough farinaceous paſte, or the moſt viſcid ſubſtances; while the heavineſs of animal food is more frequently noticed, eſpecially when in any great quantity. Difficulty of ſolution does not depend ſo much on firmneſs of texture (as a man, from fiſh of all kinds, is more oppreſſed than from firmer ſubſtances) as on viſcidity; and hence it is more frequent in animal food, eſpecially in the younger animals.

With regard to *mixture*:—There is no inſtance of difficult mixture in vegetables, except in vegetable oils; while animal foods, from both viſcidity and oilineſs, eſpecially the fatter meats, are refractory in this reſpect. Perhaps the difference of animal and vegetable foods might be referred to this head of mixture. For vegetable food continues long in the ſtomach, giving little ſtimulus: Now the ſyſtem is affected in proportion to the extent of this ſtimulus, which is incomparably greater from the animal viſcid oily food, than from the vegetable, firmer, and more aqueous. However, there are certain applications to the ſtomach, which have a tendency to bring on the cold fit of fever, independent of ſtimulus, merely by their refrigeration: and this oftener ariſes from vegetables; as we ſee, in thoſe hot countries where intermittents prevail, they are oftener induced from a ſurfeit of vegetable than of animal food. A proof of this is, that when one is recovering of an intermittent, there is nothing more apt to cauſe a relapſe than cold food, eſpecially if taken on thoſe days when the fit ſhould return, and particularly aceſcent, fermentable vegetables, as ſalad, melons, cucumbers, &c. *acido-dulces*, &c. which, according to Dr Cullen, are the moſt frequent cauſes of epidemics; therefore, when an intermitteut is to be avoided, we ſhun vegetable diet, and give animal foods, although their ſtimulus be greater.

II. *In the Inteſtines*. When the putreſcency of animal food has gone too far, it produces an active ſtimulus, cauſing diarrhœa, dyſentery, &c. But theſe effects are but rare: whereas from vegetable food and its acid, which, united with the bile, proves a pretty ſtrong ſtimulus, they more frequently occur; but, luckily, are of leſs conſequence, if the refrigeration is not very great. In the autumnal ſeaſon, when there is a tendency to dyſentery, if it is obſerved that eating of fruits brings it on, it is rather to be aſcribed to their cooling than ſtimulating the inteſtines.

As to *ſtool*—Wherever neither putrefaction nor acidity has gone a great length, animal food keeps the belly more regular. Vegetable food gives a greater proportion of feculent matter, and, when exſiccated by the ſtomach and inteſtines, is more apt to ſtagnate, and produce ſlow-belly and coſtiveneſs, than animal ſtimulating food; which, before it comes to the great guts, where ſtoppage is made, has attained a putrefactive tendency, and gives a proper ſtimulus: and thus thoſe who are coſtive from the uſe of vegetables, when they have recourſe to animal food are in this reſpect better.

III. *In the blood-veſſels*. They both give a blood of the ſame kind, but of different quality. Animal food gives it in greater quantity, being in great part, as the expreſſion is, convertible *in ſuccum et ſanguinem*, and of eaſy digeſtion; whereas vegetable is more watery, and contains a portion of unconquerable ſaline matter, which cauſes it to be thrown out of the body by ſome excretion. Animal food affords a more denſe ſtimulating elaſtic blood than vegetable; ſtretching and cauſing a greater reſiſtance in the ſolids, and again exciting their ſtronger action. It has been ſuppoſed, that aceſcency

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Food. acefcency of vegetable food is carried into the blood-veffels, and there exerts its effects; but the tendency of animal fluids is fo ftrong to alkalefcency, that the exiftence of an acid acrimony in the blood feems very improbable. Animal food alone will foon produce an alkalefcent acrimony; and if a perfon who lives entirely on vegetables were to take no food for a few days, his acrimony would be alkalefcent.

IV. We are next to take notice of the *quantity of nutriment* thefe different foods afford. Nutriment is of two kinds: the firft repairs the wafte of the folid fibres; the other fupplies certain fluids, the chief of which is oil. Now, as animal food is eafier converted, and alfo longer retained in the fyftem, and as it contains a greater proportion of oil, it will afford both kinds of nutriment more copioufly than vegetables.

V. Laftly, *As to the different degrees of perfpirability of thefe foods.* This is not yet properly determined. Sanctorius conftantly fpeaks of mutton as the moft perfpirable of all food, and of vegetables as checking perfpiration. This is a confequence of the different ftimulus thofe foods give to the ftomach, fo that perfons who live on vegetables have not their perfpiration fo fuddenly excited. In time of digeftion, perfpiration is ftopped from whatever food, much more fo from cooling vegetables. Another reafon why vegetables are lefs perfpirable is, becaufe their aqueo-faline juices determine them to go off by urine, while the more perfectly mixed animal food is more equally diffufed over the fyftem, and fo goes off by perfpiration. Hence Sanctorius's accounts may be underftood; for vegetable aliment is not longer retained in the body, but moftly takes the courfe of the kidneys. Both are equally perfpirable in this refpect, viz. that a perfon living on either, returns once a-day to his ufual weight; and if we confider the little nourifhment of vegetables, and the great tendency of animal food to corpulency, we muft allow that vegetable is more quickly perfpired than animal food.

As to the queftion, Whether man was originally defigned for animal or vegetable food, fee the article CARNIVOROUS.

With regard to the effects of thefe foods on men, it muft be obferved, that there are no perfons who live entirely on vegetables. The Pythagoreans themfelves eat milk; and thofe who do fo moftly, as thefe Pythagoreans, are weakly, fickly, and meagre, labouring under a conftant diarrhœa and feveral other difeafes. None of the hardy, robuft, live on thefe; but chiefly fuch as gain a livelihood by the exertion of their mental faculties, as (in the Eaft Indies) factors and brokers; and this method of life is now confined to the hot climates, where vegetable diet, without inconvenience, may be carried to great excefs. Though it be granted, therefore, that man is intended to live on thefe different foods promifcuoufly, yet the vegetable fhould be in very great proportion. Thus the Laplanders are faid to live entirely on animal food: but this is contradicted by the beft accounts; for Linnæus fays, that befides milk, which they take four, to obviate the bad effects of animal food, they ufe alfo calla, menyanthes, and many other plants, copioufly. So there is no inftance of any nation living entirely either on vegetable or animal food, though there are indeed fome who live particularly on one or other in the greateft proportion. In the cold countries, *e. g.* the inhabitants live chiefly on animal food, on account of the rigour of the feafon, their fmaller perfpiration, and little tendency to putrefaction. Food.

Of more importance, however, is the following than the former queftion, viz. *In what proportion animal and vegetable food ought to be mixed?*

1. *Animal* food certainly gives moft ftrength to the fyftem. It is a known aphorifm of Sanctorius, that *pondus addit robur;* which may be explained from the impletion of the blood-veffels, and giving a proper degree of tenfion for the performance of ftrong ofcillations. Now animal food not only goes a greater way in fupplying fluid, but alfo gives the fluid more denfe and elaftic. The art of giving the utmoft ftrength to the fyftem is beft underftood by thofe who breed fighting cocks. Thefe people raife the cocks to a certain weight, which muft bear a certain proportion to the other parts of the fyftem, and which at the fame time is fo nicely proportioned, as that, on lofing a few ounces of it, their ftrength is very confiderably impaired. Dr Robinfon of Dublin has obferved, that the force and weight of the fyftem ought to be determined by the largenefs of the heart, and its proportion to the fyftem: for a large heart will give large blood-veffels, while at the fame time the vifcera are lefs, particularly the liver; which laft being increafed in fize, a greater quantity of fluid is determined into the cellular texture, and lefs into the fanguineous fyftem. Hence we fee how animal food gives ftrength, by filling the fanguiferous veffels. What pains we now beftow on cocks, the ancients did on the Athletæ, by proper nourifhment bringing them to a great degree of ftrength and agility. It is faid that men were at firft fed on figs, a proof of which we have from their nutritious quality: however, in this refpect they were foon found to fall far fhort of animal food; and thus we fee, that men, in fome meafure, will work in proportion to the quality of their food. The Engliih labour more than the Scots; and wherever men are expofed to hard labour, their food fhould be animal. Animal food, although it gives ftrength, yet loads the body; and Hippocrates long ago obferved, that the athletic habit, by a fmall increafe, was expofed to the greateft hazards. Hence it is only proper for bodily labours, and entirely improper for mental exercifes; for whoever would keep his mind acute and penetrating, will exceed rather on the fide of vegetable food. Even the body is oppreffed with animal food; a full meal always produces dulnefs, lazinefs, and yawning; and hence the feeding of gameiters, whofe mind muft be ready to take advantage, is always performed by avoiding a large quantity of animal food. Farther, with regard to the ftrength of the body, animal food in the firft ftage of life is hardly neceffary to give ftrength: in manhood, when we are expofed to active fcenes, it is more allowable; and even in the decline of life, fome proportion of it is neceffary to keep the body in vigour. There are fome difeafes which come on in the decay of life, at leaft are aggravated by it; among thefe the moft remarkable is the gout. This, when it is in the fyftem, and does not appear with inflammation in the extremities, has pernicious effects there, attacking the lungs, ftomach, head, &c. Now to determine this to the extremities, a large proportion

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Food. of animal food is neceſſary, eſpecially as the perſon is commonly incapable of much exerciſe.

Animal food, although it gives ſtrength, is yet of many hazards to the ſyſtem, as it produces plethora and all its conſequences. As a ſtimulus to the ſtomach and to the whole ſyſtem, it excites fever, urges the circulation, and promotes the perſpiration. The ſyſtem, however, by the repetition of theſe ſtimuli, is ſoon worn out; and a man who has early uſed the athletic diet, is either early carried off by inflammatory diſeaſes, or, if he takes exerciſe ſufficient to render that diet ſalutary, ſuch an accumulation is made of putreſcent fluids, as in his after-life lays a foundation for the moſt inveterate chronic diſtempers. Therefore it is to be queſtioned, whether we ſhould deſire this high degree of bodily ſtrength, with all the inconveniences and dangers attending it. Thoſe who are chiefly employed in mental reſearches, and not expoſed to too much bodily labour, ſhould always avoid an exceſs of animal food. There is a diſeaſe which ſeems to require animal food, viz. the hyſteric or hypochondriac; and which appears to be very much a-kin to the gout, affecting the alimentary canal. All people affected with this diſeaſe are much diſpoſed to aceſcency; which ſometimes goes ſo far, that no other vegetable but bread can be taken in, without occaſioning the worſt conſequences. Here then we are obliged to preſcribe an animal diet, even to thoſe of very weak organs; for it generally obviates the ſymptoms. However, ſeveral inſtances of ſcurvy in exceſs have been produced by a long-continued uſe of this diet, which it is always unlucky to be obliged to preſcribe; and when it is abſolutely neceſſary to preſcribe, it ſhould be joined with as much of the vegetable as poſſible, and when a cure is performed we ſhould gradually recur to that again.

2. Next, let us conſider the *vegetable* diet. The chief inconveniency of this is difficulty of aſſimilation; which, however, in the vigorous and exerciſed, will not be liable to occur. In warm climates, the aſſimilation of vegetable aliment is more eaſy, ſo that *there* it may be more uſed, and when joined to exerciſe gives a pretty tolerable degree of ſtrength and vigour; and though the general rule be in favour of *animal* diet, for giving ſtrength, yet there are many inſtances of its being remarkably produced from vegetable. Vegetable diet has this advantage, that it whets the appetite, and that we can hardly ſuffer from a full meal of it. Beſides the diſorders it is liable to produce in the *primæ viæ*, and its falling ſhort to give ſtrength, there ſeem to be no bad conſequences it can produce in the blood-veſſels; for there is no inſtance where its peculiar acrimony was ever carried there, and it is certainly leſs putrifiable than animal food; nor, without the utmoſt indolence, and a ſharp appetite, does it give plethora, or any of its conſequences: ſo that we cannot here but conclude, that a large proportion of vegetable food is uſeful for the generality of mankind.

There is no error in this country more dangerous, or more common, than the neglect of bread: for it is the ſafeſt of vegetable aliment, and the beſt corrector of animal food; and, by a large proportion of this alone, its bad conſequences, when uſed in a hypochondriac ſtate, have been obviated. The French apparently have as much animal food on their tables as the Britons; and yet, by a greater uſe of bread and the dried acid fruits, its bad effects are prevented; and therefore bread ſhould be particularly uſed by the Engliſh, as they are ſo voracious of animal food. Vegetable food is not only neceſſary to ſecure health, but long life: and, as we have ſaid, in infancy and youth we ſhould be confined to it moſtly; in manhood, and decay of life, uſe animal food; and, near the end, vegetable again. Food.

There is another queſtion much agitated, viz. *What are the effects of variety in food?* Is it neceſſary and allowable, or univerſally hurtful? Variety of a certain kind ſeems neceſſary; as vegetable and animal foods have their mutual advantages, tending to correct each other. Another variety, which is very proper, is that of liquid and ſolid food, which ſhould be ſo managed as to temper each other; and liquid food, eſpecially of the vegetable kind, is too ready to paſs off before it is properly aſſimilated, while ſolid food makes a long ſtay. But this does not properly belong to the queſtion, whether variety of the ſame kind is neceſſary or proper, as in animal-foods, beef, fiſh, fowl, &c. It doth not appear that there is any inconvenience ariſing from this mixture or difficulty of aſſimilation, provided a moderate quantity be taken. When any inconvenience does ariſe, it probably proceeds from this, that one of the particular ſubſtances in the mixture, when taken by itſelf, would produce the *ſame effects*; and, indeed, it would appear, that this effect is not *heightened* by the mixture, but properly *obviated* by it. There are few exceptions to this, if any, *e. g.* taking a large proportion of aceſcent ſubſtances with milk. The coldneſs, &c. acidity, flatulency, &c. may appear; and it is poſſible that the coagulum, from the aceſcency of the vegetables, being ſomewhat ſtronger induced, may give occaſion to too long retention in the ſtomach, and to acidity in too great degree. Again, the mixture of fiſh and milk often occaſions inconveniences. The theory of this is difficult, though, from univerſal conſent, it muſt certainly be juſt. Can we ſuppoſe that fiſh gives occaſion to ſuch a coagulum as runnet? If it does ſo, it may produce bad effects. Beſides, fiſhes approach ſomewhat to vegetables, in giving little ſtimulus; and are accuſed of the ſame bad effects as theſe, viz. bringing on the cold fit of fever.

Thus much may be ſaid for variety. But it alſo has its diſadvantages, provoking to gluttony; this, and the art of cookery, making men take in more than they properly can digeſt: and hence, perhaps, very juſtly, phyſicians have univerſally almoſt preferred ſimplicity of diet; for, in ſpite of rules, man's eating will only be meaſured by his appetite, and ſatiety is ſooner produced by *one* than by *many* ſubſtances. But this is ſo far from being an argument againſt variety, that it is one for it, as the only way of avoiding a full meal of animal-food, and its bad effects, is by preſenting a quantity of vegetables. Another mean of preventing the bad effects of animal-food, is to take a large proportion of liquid; and hence the bad effects of animal-food are leſs felt in Scotland, on account of their drinking much with it, and uſing broths, which are at once excellent correctors of animal-food and preventives of gluttony.

With regard to the differences between ANIMAL FOODS, properly ſo called, the firſt regards their ſolubility,

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Food. lity, depending on a lax or firm texture of their different kinds.

I. Solubility of animal food ſeems to deſerve leſs attention than is commonly imagined; for there are many inſtances of perſons of a weak ſtomach incapable of breaking down the texture of vegetables, or even of diſſolving a light pudding, to whom hung beef, or a piece of ham, was very grateful and eaſily digeſted. None of the theories given for the ſolution of animal-food in the human ſtomach ſeem to have explained that proceſs ſufficiently. Long ago has been diſcarded the ſuppoſition of an active corroſive menſtruum there; and alſo the doctrine of trituration, for which, indeed, there ſeems no mechaniſm in the human body; and, till lately, phyſicians commonly agreed with Boerhaave in ſuppoſing nothing more to be neceſſary than a watery menſtruum, moderate heat, and frequent agitation. This will account for ſolution in ſome caſes, but not entirely. Let us try to imitate it out of the body with the ſame circumſtances, and in ten times the time in which the food is diſſolved in the ſtomach we ſhall not be able to bring about the ſame changes. Take the coagulated white of an egg, which almoſt every body can eaſily digeſt, and yet no artifice ſhall be able to diſſolve it. Hence, then, we are led to ſeek another cauſe for ſolution, *viz.* fermentation; a notion, indeed, formerly embraced, but, on the introduction of mechanical philoſophy, induſtriouſly baniſhed, with every other ſuppoſition of that proceſs taking place at all in the animal economy.

Many of the ancients imagined this fermentation to be putrefactive. But this we deny, as an acid is produced; though hence the fermentation might be reckoned the vinous, which, however, ſeems always to be morbid. Neither, indeed, is the fermentation purely acetous, but modified by putreſcence; for Pringle has obſerved, that animal-matters raiſe and even expede the acetous proceſs. The fermentation, then, in the ſtomach is of a mixed nature, between the acetous and putrefactive, mutually modifying each other; though, indeed, in the inteſtines, ſomewhat of the putrefactive ſeems to take place, as may be obſerved from the ſtate of the feces broke down, and from the little diſpoſition of ſuch ſubſtances to be ſo, which are not liable to the putrefactive proceſs, as the firmer parts of vegetables, &c. Upon this view ſolution ſeems to be extremely eaſy, and thoſe ſubſtances to be moſt eaſily broke down which are moſt ſubject to putrefaction. See Anatomy, n° 104. and *Gastric Juice*.

But ſolution alſo depends on other circumſtances, and hence requires a more particular regard.

1. There is a difference of ſolubility with reſpect to the manducation of animal-food, for which bread is extremely neceſſary, in order to keep the more ſlippery parts in the mouth till they be properly comminuted*. From want of proper manducation perſons are ſubject to eructations; and this more frequently from the firm vegetable foods, as apples, almonds, &c. than from the animal, though, indeed, even from animal food, very tendinous, or ſwallowed in unbroken maſſes, ſuch ſometimes occur. Manducation is ſo much connected with ſolution, that ſome, from imperfectly performing that, are obliged to belch up their food, remanducate it, and ſwallow it again before the ſtomach can diſſolve it, or proper nouriſhment be extracted. Another proof of our regard to ſolubility, is our rejecting the firmer parts of animal-food, as bull-beef, and generally carnivorous animals. Food.

* See the article *Bread*.

2. Its effects with regard to ſolubility ſeem alſo to be the foundation of our choice between *fat* and *lean*, *young* and *old meats*. In the *lean*, although perhaps a ſingle fibre might be ſufficiently tender, yet theſe, when collected in *faſciculi*, are very firm and compact, and of difficult ſolution; whereas in the *fat* there is a greater number of veſſels, a greater quantity of juice, more interpoſition of cellular ſubſtance, and conſequently more ſolubility. Again, in young animals, there is probably the ſame number of fibres as in the older, but theſe more connected: whereas, in the older, the growth depending on the ſeparation of theſe, and the increaſe of veſſels and cellular ſubſtance, the texture is leſs firm and more ſoluble; which qualities, with regard to the ſtomach, are at that time too increaſed, by the increaſed alkaleſcency of the animal. To this alſo may be referred our choice of caſtrated animals, *viz.* on account of their diſpoſition to fatten after the operation.

3. It is with a view to the ſolubility, that we make a choice between meats recently killed, and thoſe which have been kept for ſome time. As ſoon as meat is killed, the putrefactive proceſs begins; which commonly we allow to proceed for a little, as that proceſs is the moſt effectual breaker down of animal matters, and a great aſſiſtance to ſolution. The length of time during which meat ought to be kept, is proportioned to the meat's tendency to undergo the putrid fermentation, and the degree of thoſe circumſtances which favour it: Thus, in the torrid zone, where meat cannot be kept above four or five hours, it is uſed much more recent than in theſe northern climates.

4. *Boiled* or *roaſted* meats create a difference of ſolution. By boiling we extract the juices interpoſed between the fibres, approximate them more to each other, and render them of more difficult ſolubility; which is increaſed too by the extraction of the juices, which are much more alkaleſcent than the fibres: but when we want to avoid the ſtimulus of alkaleſcent food, and the quick ſolution, as in ſome caſes of diſeaſe, the roaſted is not to be choſen. Of roaſted meat it may be aſked, which are more proper, thoſe which are moſt or leaſt roaſted? That which is leaſt done is certainly the moſt ſoluble: even raw meats are more ſoluble than dreſſed, as Dr Cullen was informed by a perſon who from neceſſity was obliged, for ſome time, to eat ſuch. But at the ſame time that meats little done are very ſoluble, they are very alkaleſcent; ſo that, wherever we want to avoid alkaleſcency in the *prime viæ*, the moſt roaſted meats ſhould be choſen. Thoſe who throw away the broths of boiled meat do very improperly; for, beſides their ſupplying a fluid, from their greater alkaleſcency they increaſe the ſolubility of the meat. Here we ſhall obſerve, that pure blood has been thought inſoluble. Undoubtedly it is very nutritious; and though out of the body, like the white of eggs, it ſeems very inſoluble, yet, like that too, in the body it is commonly eaſily digeſted. Moſes very properly forbad it the Iſraelites, as in warm countries it is highly alkaleſcent; and even here, when it was uſed in great quantity, the ſcurvy was more

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Food. more frequent: but to a moderate use of it, in these climates, no such objection takes place.

5. Solubility is varied from another source, *viz.* viscidity of the juice of aliment. Young animals, then, appear more soluble than old, not only on account of the compaction and firmness of texture in the latter, but also their greater viscidity of juice. And nothing is more common, than to be longer oppressed from a full meal of veal, than from the same quantity of beef, &c. Upon account, too, of their greater viscidity of juice, are the tendinous and ligamentous parts of animals longer retained than the purely muscular, as well as on account of their firmness of texture. Even fishes, whose muscular parts are exceedingly tender, are, on account of their gluey viscosity, longer of solution in the stomach. And eggs, too, which are exceedingly nourishing, have the same effect, and cannot be taken in great quantity: For the stomach is peculiarly sensible to gelatinous substances; and by this means has nature perhaps taught us, as it were by a sort of instinct, to limit ourselves in the quantity of such nutritive substances.

6. With regard to solution, we must take in the oils of animal-food; which, when tolerably pure, are the least putrescent part of it, and, by diminishing the cohesion of the fibres, render them more soluble. On this last account is the lean of fat meat more easily dissolved than other lean. But when the meat is exposed to much heat, this oil is separated, leaving the solid parts less easily soluble, and becoming itself empyreumatic, rancescent, and of difficult mixture in the stomach. Fried meats, from the reasons now given, and baked meats, for the same, as well as for the tenacity of the paste, are preparations which diminish the solubility of the food. From what has been said, the preparation of food by fattening it, and keeping it for some time after killed, although it may administer to gluttony, will yet, it must be confessed, increase the solution of the food.

II. The second difference of animal-food is with regard to ALKALESCENCY.

Of this we have taken a little notice already under the head of *Solubility*.

1. From their too great alkalescency we commonly avoid the carnivorous animals, and the *feræ*; and choose rather the granivorous. Some birds, indeed, which live on insects, are admitted into our food; but no man, without *nausea*, can live upon these alone for any length of time. Fishes, too, are an exception to this rule, living almost universally on each other. But in these the alkalescency does not proceed so far; whether from the viscidity of their juice, their want of heat, or some peculiarity in their economy, is not easy to determine.

2. Alkalescency is determined by difference of age. The older animals are always more alkalescent than the young, from their continual progress to putrefaction. Homberg always found, in his endeavours to extract an acid from human blood, that more was obtained from the young than from the old animals.

3. A third circumstance which varies the alkalescency of the food, is the wildness or tameness of the animal; and this again seems to depend on its exercise. Dr Cullen knew a gentleman who was fond of cats for food: but he always used to feed them on vegetable food, and kept them from exercise; and in the same manner did the Romans rear up their rats, when intended for food. In the same way the flesh of the partridge and the hen seems to be much the same; only, from its being more on the wing, the one is more alkalescent than the other. Again, tame animals are commonly used without their blood; whereas the wild are commonly killed in their blood, and upon that account, as well as their greater exercise, are more alkalescent. Food.

4. The alkalescency of food may be determined from the quantity of volatile salt it affords. The older the meat is, it is found to give the greater proportion of volatile salt.

5. The alkalescency of aliment may also, in some measure, be determined from its colour, the younger animals being whiter and less alkalescent. We also take a mark from the colour of the gravy poured out, according to the redness of the juices judging of the animal's alkalescency.

6. The relish of food is found to depend much on its alkalescency, as does also the stimulus it gives and the fever it produces in the system. These effects are also complicated with the viscidity of the food, by which means it is longer detained in the stomach, and the want of alkalescency supplied.

Having mentioned animal food as differing in solubility and alkalescency, which often go together in the same subject, we come to the third difference, *viz.*

III. QUANTITY of Nutriment. Which is either absolute or relative: absolute with respect to the quantity it really contains, sufficient powers being given to extract it; relative, with respect to the assimilatory powers of those who use it. The absolute nutriment is of some consequence; but the relative, in the robust and healthy, and except in cases of extraordinary weakness, may, without much inconvenience, be disregarded. In another case is the quantity of nourishment relative, *viz.* with regard to its *perspirability*; for if the food is soon carried off by the excretions, it is the same thing as if it contained a less proportion of nourishment. For, giving more fluid, that which is longer retained affords most; and, for the repair of the solids, that retention also is of advantage. Now, gelatinous substances are long retained; and besides, are themselves animal substances dissolved: so that, both absolutely and relatively, such substances are nutritious. Of this kind are eggs, shell-fish, &c. In adults, though it is disputed whether their solids need any repair, yet, at any rate, at this period, fluid is more required; for this purpose the alkalescent foods are most proper, being most easily dissolved. They are, at the same time, the most perspirable; on one hand that alkalescency leading to disease, while on the other their perspirability obviates it. Adults, therefore, as writers justly observe, are better nourished on the alkalescent; the young and growing, on gelatinous foods. All this leads to a comparison of young and old meats; the first being more gelatinous, and the last more alkalescent. This, however, by experience, is not yet properly ascertained. Mr Geoffroy is the only person who has been taken up with the analysis of foods. See *Memoires de l'Academie*, l'an. 1731 & 1732. His attempt was certainly laudable, and in some respects usefully performed; but, in general, his experimenta-

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ments were not sufficiently repeated, nor are indeed sufficiently accurate. He has not been on his guard against the various circumstances which affect meats; the cow-kind liking a moist succulent herbage, which is not to be got in warm climates; while the sheep are fond of a dry food, and thrive best there. Again, some of his experiments seem contradictory. He says, that veal gives more solution than beef, while lamb gives less than mutton, which is much to be doubted. If both he and Sanctorius had examined English beef, the result probably would have been very different as to its perspirability, &c. Besides, Mr Geoffroy has only analysed beef and veal when raw; has made no proper circumstantial comparisons between quadrupeds and birds; and has examined these last along with their bones, and not their muscles, &c. by themselves, as he ought to have done, &c. If a set of experiments of this kind were properly and accurately performed, they might be of great use; but, at present, for the purpose of determining our present subject, we must have recourse to our alkalescency, solubility, &c.

IV. The fourth difference of animal foods is, *The Nature of the Fluids they afford.* The whole of this will be understood from what has been said on alkalescency; the fluid produced being more or less dense and stimulating, in proportion as that prevails.

V. The fifth difference of animal-foods is with respect to their

Perspirability. The sum of what can be said on this matter is this, that such foods as promote an accumulation of fluid in our vessels, and dispose to plethora, are the least perspirable, and commonly give most strength; that the more alkalescent foods are the most perspirable, though the viscid and less alkalescent may attain the same property by long retention in the system. The authors on perspirability have determined the perspiration of foods as imperfectly as Mr Geoffroy has done the solubility, and in a few cases only. We must not lay hold on what Sanctorius has said on the perspirability of mutton, because he has not examined in the same way other meats in their perfect state; far less on what Keil says of oysters, as he himself was a valetudinarian, and consequently an unfit subject for such experiments, and probably of a peculiar temperament.

As to the effects of Food on the Mind, we have already hinted at them above. It is plain, that delicacy of feeling, liveliness of imagination, quickness of apprehension, and acuteness of judgment, more frequently accompany a weak state of the body. True it is, indeed, that the same state is liable to timidity, fluctuation, and doubt; while the strong have that steadiness of judgment, and firmness of purpose, which are proper for the higher and more active scenes of life. The most valuable state of the mind, however, appears to reside in somewhat less firmness and vigour of body. Vegetable aliment, as never over-distending the vessels or loading the system, never interrupts the stronger motions of the mind; while the heat, fulness, and weight, of animal food, are an enemy to its vigorous efforts. Temperance, then, does not so much consist in the quantity, for that always will be regulated by our appetite, as in the quality, *viz.* a large proportion of vegetable aliment.

A considerable change has now taken place in the articles made use of as food by the ancients, by substituting, instead of what were then used, particularly of the vegetable kind, a number of more bland, agreeable, and nutritive juices. The acorns and nuts of the primitive times have given way to a variety of sweeter farinaceous seeds and roots. To the malvaceous tribe of plants so much used by the Greeks and Romans, hath succeeded the more grateful spinach; and to the blite, the garden orach. The rough borage is supplanted by the acescent sorrel; and asparagus has banished a number of roots recorded by the Roman writers under the name of *bulbs*; but Linnæus is of opinion, that the parsnip has undeservedly usurped the place of the skirret. The bean of the ancients, improperly so called, being the roots as well as other parts of the *nymphæa nelumbo*, or Indian water-lily, is superseded by the kidney-bean. The garden rocket, eaten with and as an antidote against the chilling qualities of the lettuce, is banished by the more agreeable cress and tarragon; the apium by the meliorated celery; the pompion, and others of the cucurbitaceous tribe, by the melon; and the sumach berries, by the fragrant nutmeg. The silphium, or succus Cyrenaicus, which the Romans purchased from Persia and India at a great price, and is thought by some to have been the asafetida of the present time, is no longer used in preference to the alliaceous tribe.

Food of Foosht.

To turn from the vegetable to some of the animal substitutes, we may mention the carp among fishes as having excluded a great number held in high estimation among the Romans. The change of oil for butter; of honey for sugar; of mulsa, or liquors made of wine, water, and honey, for the wines of modern times; and that of the ancient zythus for the present improved malt liquors; not to mention also the *callida* of the Roman taverns, analogous to our tea and coffee.

Food of Plants. See Agriculture, n° 1—6. and Plants; also the article Composts.

FOOL, according to Mr Locke, is a person who makes false conclusions from right principles; whereas a madman, on the contrary, draws right conclusions from wrong principles. See Folly.

Fool-Stones, in botany. See Orchis.

FOOSHT, an island in the Red Sea; situated, according to the observations of Mr Bruce, in N. Lat. 15° 59′ 43″. It is described by him as about five miles in length from north to south, though only *nine* in circumference. It is low and sandy in the southern part, but the north rises in a black hill of inconsiderable height. It is covered with a kind of bent-grass, which never arrives at any great length by reason of want of rain and the constant browzing of the goats. There are great appearances of the black hill having once been a volcano; and near the north cape the ground sounds hollow like the Solfaterra in Italy. There are a vast number of beautiful fish met with upon the coasts, but few fit for eating; and our traveller observed, that the most beautiful were the most noxious when eaten; none, indeed, being salutary food excepting those which resembled the fish of the northern seas. There are many beautiful shell-fish, as the concha veneris, of several colours and sizes; sea-urchins, &c. Spunges are likewise found all along the coast. There are also pearls, but neither large nor of a good water; in consequence of which they sell at no great price. They are produced by a species of bivalve shells. Several

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Foot. veral large ſhells, from the fiſh named *biſſer*, are met with upon ſtones of ten or twelve tons weight along the coaſt. They are turned upon their faces and ſunk into the ſtones, as into a paſte, the ſtone being raiſed all about them in ſuch a manner as to cover the edge of the ſhell; "a proof (ſays Mr Bruce) that this ſtone muſt ſome time lately have been ſoft or liquefied: for had it been long ago, the ſun and air would have worn the ſurface of the ſhell; but it ſeems perfectly entire, and is ſet in that hard brown rock as the ſtone of a ring is in a golden chaſing."—The water in this iſland is very good.

The inhabitants of Fooſht are poor fiſhermen of a ſwarthy colour; going naked, excepting only a rag about their waiſt. They have no bread but what they procure in exchange for the fiſh they catch. What they barter in this manner is caled *feajan*. But beſides this they catch another ſpecies, which is flat, with a long tail, and the ſkin made uſe of for ſhagreen, of which the handles of knives and ſwords are made. There is a ſmall town on the iſland, conſiſting of about 30 huts, built with faggots of bent graſs or ſpartum, ſupported by a few ſticks, and thatched with graſs of the ſame kind of which they are built.

FOOT, a part of the body of moſt animals whereon the ſtand, walk, &c. See ANATOMY, n° 63.

FOOT, in the Latin and Greek poetry, a metre or meaſure, compoſed of a certain number of long and ſhort ſyllables.

Theſe feet are commonly reckoned 28: of which ſome are ſimple, as conſiſting of two or three ſyllables, and therefore called *diſſyllabic* or *triſyllabic feet*; others are compound, conſiſting of four ſyllables, and are therefore called *tetraſyllabic feet*.

The diſſyllabic feet are four in number, *viz.* the pyrrhichius, ſpondeus, iambus, and trocheus. See PYRRHICHIUS, &c.

The triſyllabic feet are eight in number, *viz.* the dactylus, anapæſtus, tribrachys, moloſſus, amphibrachys, amphimacer, bacchius, and antibacchius. See DACTYL, &c.

The tetraſyllabic are in number 16, *viz.* the procleuſmaticus, diſpondeus, choriambus, antiſpaſtus, diiambus, dichoreus, ionicus a majore, ionicus a minore, epitritus primus, epitritus ſecundus, epitritus tertius, epitritus quartus, pæon primus, pæon ſecundus, pæon tertius, and pæon quartus. See PROCLEUSMATICUS, &c.

FOOT is alſo a long meaſure conſiſting of 12 inches. Geometricians divide the foot into 10 digits, and the digit into 10 lines.

Foot-Halt, the name of a particular diſorder incident to ſheep. It takes its ſource from an inſect, which, when it comes to a certain maturity, reſembles a worm of two, three, or four inches in length. The firſt appearance of the malady is, when the ſheep gives ſigns of being lame, which increaſes to ſo high a degree as to prevent grazing; when, what with want of ſufficient food and pain, the poor animal ſuffers greatly, and lingers till it dies a natural death, if not properly attended to, by extracting the inſect or worm; the ſooner the better, as it is very eaſily performed.

As ſoon as the lameneſs is perceived, let the foot that is lame be examined between the cloſe of the claws, and it will be found that in the ſkin where the cloſe ſeparates is a ſmall hole (not natural), through which the inſect, when yet ſmall, gets its entrance, and by degrees has worked itſelf upwards along the leg, between the outward ſkin and bone, and obtains its largeſt magnitude. Proportionally it finds its nouriſhment, and is left undiſturbed. This worm muſt be extracted by moving the claws backward and forward in contrary directions; and it will not be long before the under part of the worm makes its appearance at the above mentioned ſmall hole, and continuing the ſame operation of moving the claws, the whole worm will work itſelf out; which is better than when at its firſt appearance it ſhould be drawn out with danger of breaking off, and part of it ſhould remain in the ſheep's leg, and by its rotting there may be hurtful. This eaſy and ſimple operation will be found effectual without any other kind of application whatever, nature herſelf curing the channel which the worm had made along the leg. Foot, Foote.

It is obſerved, this malady is in ſome years more prevalent than in others, particularly in wet ſeaſons than in drier; more obſerved to begin in ſpring and autumn than in ſummer and winter; notwithſtanding, what with ſnow, &c. ſheep ſuffer more by the wet in winter than in any of the other ſeaſons (poſſibly it is not then the ſeaſon for this ſort of inſect). In high healthy grounds, the ſheep are leſs liable to it than in low marſhy and meadow grounds: from all which circumſtances it may be ſuppoſed, that this inſect, in its firſt ſtate, has for its moſt natural element either the earth, water, or air; and only gets accidentally between the cloſe of the claws of the ſheep, and finds there what is ſufficient for its nouriſhment and ſecurity.

Foot Square, is the ſame meaſure both in breadth and length, containing 144 ſquare or ſuperficial inches.

Cubic or *Solid Foot*, is the ſame meaſure in all the three dimenſions, length, breadth, and depth or thickneſs, containing 1728 cubic inches.

Foot of a Horſe, in the manege, the extremity of the leg, from the coronet to the lower part of the hoof.

Foot-Level, among artificers, an inſtrument that ſerves as a foot-rule, a ſquare, and a level. See LEVEL, RULE, and SQUARE.

FOOTE (Samuel, Eſq;), the modern Ariſtophanes, was born at Truro, in Cornwall; and was deſcended from a very ancient family. His father was member of parliament for Tiverton, in Devonſhire; and enjoyed the poſt of commiſſioner of the prize office and fine-contract. His mother was heireſs of the Dinely and Goodere families. In conſequence of a fatal miſunderſtanding between her two brothers, Sir John Dinely Goodere, Bart. and Samuel Goodere, Eſq; captain of his majeſty's ſhip the Ruby, which ended in the death of both, a conſiderable part of the Goodere eſtate, which was better than 5000l. *per annum*, deſcended to Mr Foote.

He was educated at Worceſter college, Oxford, which owed its foundation to Sir Thomas Cookes Winford, Bart. a ſecond couſin of our author's. On leaving the univerſity, he commenced ſtudent of law in the Temple; but as the dryneſs of this ſtudy did not ſuit the livelineſs of his genius, he ſoon relinquiſhed it.

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Foote. He married a young lady of a good family and ſome fortune; but their tempers not agreeing, a perfect harmony did not long ſubſiſt between them. He now launched into all the faſhionable foibles of the age, gaming not excepted; and in a few years ſpent his whole fortune. His neceſſities led him to the ſtage, and he made his firſt appearance in the character of Othello. He next performed Fondlewife with much more applauſe; and this, indeed, was ever after one of his capital parts. He attempted Lord Foppington likewiſe, but prudently gave it up. But as Mr Foote was never a capital actor in the plays of others, his ſalary was very unequal to his gay and extravagant turn; and he contracted debts which forced him to take refuge within the verge of the court. On this occaſion, he relieved his neceſſities by the following ſtratagem. Sir Fr—s D—l—l had long been his intimate friend, and had diſſipated his fortune by ſimilar extravagance. Lady N-ſſ-u P—l-t, who was likewiſe an intimate acquaintance of Foote's, and who was exceeding rich, was fortunately at that time bent upon a matrimonial ſcheme. Foote ſtrongly recommended to her to conſult upon this momentous affair the conjurer in the Old Bailey, whom he repreſented as a man of ſurpriſing ſkill and penetration. He employed an acquaintance of his own to perſonate the conjurer; who depicted Sir Fr—s D—l—l at full length; deſcribed the time when, the place where, and the dreſs in which ſhe would ſee him. The lady was ſo ſtruck with the coincidence of every circumſtance, that ſhe married D—l—l in a few days. For this ſervice Sir Francis ſettled an annuity upon Foote; and this enabled him once more to emerge from obſcurity.

In 1747 he opened the little theatre in the Haymarket, taking upon himſelf the double character of author and performer; and appeared in a dramatic piece of his own compoſing, called the *Diverſions of the Morning*. This piece conſiſted of nothing more than the exhibition of ſeveral characters well known in real life; whoſe manner of converſation and expreſſion this author very happily hit off in the diction of his drama, and ſtill more happily repreſented on the ſtage, by an exact and moſt amazing imitation, not only of the manner and tone of voice, but even of the very perſons, of thoſe whom he intended to take off. In this performance, a certain phyſician, Dr L---n, well known for the oddity and ſingularity of his appearance and converſation, and the celebrated Chevalier Taylor, who was at that time in the height of his popularity, were made objects of Foote's ridicule; the latter, indeed, very deſervedly; and, in the concluding part of his ſpeech, under the character of a theatrical director, Mr Foote took off, with great humour and accuracy, the ſeveral ſtyles of acting of every principal performer on the Engliſh ſtage. This performance at firſt met with ſome oppoſition from the civil magiſtrates of Weſtminſter, under the ſanction of the act of parliament for limiting the number of playhouſes, as well as from the jealouſy of one of the managers of Drury-lane playhouſe; but the author being patronized by many of the principal nobility, and other perſons of diſtinction, this oppoſition was over-ruled: and having altered the title of his performance, Mr Foote proceeded, without further moleſtation, to give *Tea in a Morning* to his friends, and repreſented it through a run of 40 mornings to crowded and ſplendid audiences.— Foote. The enſuing ſeaſon he produced another piece of the ſame kind, which he called *An Auction of Pictures*. In this performance he introduced ſeveral new and popular characters; particularly Sir Thomas de Veil, then the acting juſtice of peace for Weſtminſter, Mr Cock the celebrated auctioneer, and the equally famous orator Henley. This piece alſo had a very great run. —His *Knights*, which was the produce of the enſuing ſeaſon, was a performance of ſomewhat more dramatic regularity: but ſtill, although his plot and characters ſeemed leſs immediately perſonal, it was apparent that he kept ſome particular real perſons ſtrongly in his eye in the performance; and the town took upon themſelves to fix them where the reſemblance appeared to be the moſt ſtriking.—Thus Mr Foote continued from time to time to ſelect, for the entertainment of the public, ſuch characters, as well general as individual, as ſeemed moſt likely to engage their attention. His dramatic pieces, excluſive of the interlude called *Piety in Pattens*, are as follow: Taſte, The Knights, The Author, The Engliſhman in Paris, The Engliſhman returned from Paris, The Mayor of Garrat, The Liar, The Patron, The Minor, The Orators, The Commiſſary, The Devil upon Two Sticks, The Lame Lover, The Maid of Bath, The Nabob, The Cozeners, The Capuchin, The Bankrupt, and an unfiniſhed comedy called The Slanderer.—All theſe works are only to be ranked among the *petites pieces* of the theatre. In the execution they are ſomewhat looſe, negligent, and unfiniſhed; the plots are often irregular, and the cataſtrophes not always concluſive: but, with all theſe deficiencies, they contain more ſtrength of character, more ſtrokes of keen ſatire, and more touches of temporary humour, than are to be found in the writings of any other modern dramatiſt. Even the language ſpoken by his characters, incorrect as it may ſometimes ſeem, will on a cloſer examination be found entirely dramatical; as it abounds with thoſe natural minutiæ of expreſſion which frequently form the very baſis of character, and which render it the trueſt mirror of the converſation of the times in which he wrote.

In the year 1766, being on a party of pleaſure with the late duke of York, lord Mexborough, and Sir Francis Delaval, Mr Foote had the misfortune to break his leg, by a fall from his horſe; in conſequence of which, he was compelled to undergo an amputation. This accident ſo ſenſibly affected the duke, that he made a point of obtaining for Mr Foote a patent for life; whereby he was allowed to perform, at the little theatre in the Haymarket, from the 15th of May to the 15th of September every year.

He now became a greater favourite of the town than ever: his very laughable pieces, with his more laughable performance, conſtantly filled his houſe; and his receipts were ſome ſeaſons almoſt incredible. Parſimony was never a vice to be aſcribed to Mr Foote; his hoſpitality and generoſity were ever conſpicuous; he was viſited by the firſt nobility, and he was ſometimes honoured even by royal gueſts.

The attack made upon his character by one of his domeſtics, whom he had diſmiſſed for miſbehaviour, is too well known to be particularized here. Suffice it to ſay, he was honourably acquitted of that charge: but it is believed by ſome, that the ſhock which he received

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Foote
H
Forbes.

ceived from it accelerated his death; others pretend, that his literary altercation with a certain *then* ducheſs, or rather her agents, much affected him, and that from that time his health declined. It is probable, however, that his natural volatility of ſpirits could ſcarcely fail to ſupport him againſt all impreſſions from either of theſe quarters.

Mr Foote, finding his health decline, entered into an agreement with Mr Colman, for his patent of the theatre; according to which, he was to receive from Mr Colman L.1600 *per annum*, beſides a ſtipulated ſum whenever he choſe to perform. Mr Foote made his appearance two or three times in ſome of the moſt admired characters; but being ſuddenly affected with a paralytic ſtroke one night whilſt upon the ſtage, he was compelled to retire. He was adviſed to bathe; and accordingly repaired to Brightelmſtone, where he apparently recovered his former health and ſpirits, and was what is called the *fiddle of the company* who reſorted to that agreeable place of amuſement. A few weeks before his death, he returned to London; but, by the advice of his phyſicians, ſet out with an intention to ſpend the winter at Paris and in the ſouth of France. He had got no farther than Dover, when he was ſuddenly attacked by another ſtroke of the palſy, which in a few hours terminated his exiſtence. He died on the 21ſt of October 1777, in the 56th year of his age, and was privately interred in the cloiſters of Weſtminſter abbey.

FOP, probably derived from the *vappa* of Horace, applied in the firſt ſatire of his firſt book to the wild and extravagant Nævius, is uſed among us to denote a perſon who cultivates a regard to adventitious ornament and beauty to exceſs.

FORAMEN, in anatomy, a name given to ſeveral apertures or perforations in divers parts of the body; as, 1. The external and internal foramina of the cranium or ſkull. 2. The foramina in the upper and lower jaw. 3. Foramen lachrymale. 4. Foramen membranæ tympani.

Foramen Ovale, an oval aperture or paſſage through the heart of a fœtus, which cloſes up after birth. It ariſes from the coronal vein, near the right auricle, and paſſes directly into the left auricle of the heart, ſerving for the circulation of the blood in the fœtus, till ſuch time as the infant breathes, and the lungs are open; it being generally reckoned one of the temporary parts of the fœtus, wherein it differs from an adult; although almoſt all anatomiſts, Mr Cheſelden excepted, aſſure us, that the foramen ovale has ſometimes been found in adults. See Fœtus.

FORBES (Patrick), biſhop of Aberdeen, was born in 1564, when the affairs of the church of Scotland were in much confuſion; to the ſettlement of which he greatly contributed. As chancellor of the univerſity of Aberdeen, he improved that ſeat of learning by repairing the fabric, augmenting the library, and reviving the profeſſorſhips. He publiſhed a *Commentary on the Revelations*, at London, in 1613; and died in 1635.

Forbes (John), the ſon of Patrick, but of much more extenſive learning than his father, was perhaps excelled by none of his age, which will be allowed by thoſe who read his *Hiſtorical and Theological Inſtitutes*. He was biſhop of Aberdeen; but was expelled by the Covenanters, and forced to fly beyond ſea. He continued in Holland two years; and, upon his return, lived private on his eſtate at Corſe, until he died in 1648. An edition of all his works was printed in two vols folio at Amſterdam in 1703.

Forbes (William), a learned biſhop of Edinburgh, born in 1585. His ill-health and the anti-epiſcopal diſpoſition of the Scots, confined him chiefly to a retired life: but when Charles I. in 1633, founded an epiſcopal church at Edinburgh, he thought none more worthy to fill the ſee than Mr Forbes; who, however, died three months after his conſecration, in 1634. Though very able and learned, he publiſhed nothing; but wrote a treatiſe to pacify controverſies, which was printed at London 24 years after his death.

Forbes (Duncan, Eſq; of Culloden), was born in the year 1685. In his early life, he was brought up in a family remarkable for hoſpitality; which, perhaps, led him afterwards to a freer indulgence in ſocial pleaſures. His natural diſpoſition inclined him to the army: but, as he ſoon diſcovered a ſuperior genius, by the advice of his friends he applied himſelf to letters. He directed his ſtudies particularly to the civil law; in which he made a quick progreſs, and in 1709 was admitted an advocate. From 1722 to 1737, he repreſented in parliament the boroughs of Inverneſs, Fortroſe, Nairn, and Forres. In 1725, he was made king's advocate; and Lord Preſident of the Court of Seſſion in 1737. In the troubles of 1715 and 1745 he eſpouſed the royal cauſe; but with ſo much prudence and moderation did he conduct himſelf at this delicate conjuncture, that not a whiſper was at any time heard to his prejudice. The glory he acquired in advancing the proſperity of his country, and in contributing to re-eſtabliſh peace and order, was the only reward of his ſervices. He had even impaired, and almoſt ruined, his private fortune in the cauſe of the public; but government did not make him the ſmalleſt recompenſe. The miniſter, with a meanneſs for which it is difficult to account, deſired to have a ſtate of his diſburſements. He was ſo much ſhocked at the rudeneſs of this treatment, that he left the miniſter without making any reply. Throughout the whole courſe of his life he had a lively ſenſe of religion, without the leaſt taint of ſuperſtition; and his charity was extended to every ſect and denomination of religioniſts indiſcriminately. He was well verſed in the Hebrew language; and wrote, in a flowing and oratorial ſtyle, concerning religion natural and revealed, ſome important diſcoveries in theology and philoſophy, and concerning the ſources of incredulity. He died in 1747, in the 62d year of his age; and his works have ſince been publiſhed in two volumes octavo.

Forbes
Force.

FORCE, in philoſophy, denotes the cauſe of the change in the ſtate of a body, when, being at reſt, it begins to move, or has a motion which is either not uniform or not direct. Whilſt a body remains in the ſame ſtate, either of reſt or of uniform and rectilinear motion, the cauſe of its remaining in ſuch a ſtate is in the nature of the body, and it cannot be ſaid that any extrinſic force has acted on it. This internal cauſe or principle is called *inertia*.

Mechanical forces may be reduced to two ſorts; one of a body at reſt, the other of a body in motion.

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Force. The force of a body at reſt, is that which we conceive to be in a body lying ſtill on a table, or hanging by a rope, or ſupported by a ſpring, &c. and this is called by the names of *preſſure*, *tenſion*, *force*, or *vis mortua*, *ſolicitatio*, *conatus movendi*, *conamen*, &c. To this claſs alſo of forces we muſt refer centripetal and centrifugal forces, though they reſide in a body in motion; becauſe theſe forces are homogeneous to weights, preſſures, or tenſions of any kind.

The force of a body in motion is a power reſiding in that body ſo long as it continues its motion; by means of which it is able to remove obſtacles lying in its way; to leſſen, deſtroy, or overcome the force of any other moving body, which meets it in an oppoſite direction; or to ſurmount any dead preſſure or reſiſtance, as tenſion, gravity, friction, &c. for ſome time; but which will be leſſened or deſtroyed by ſuch reſiſtance as leſſens or deſtroys the motion of the body. This is called *moving force*, *vis motrix*, and by ſome late writers *vis viva*, to diſtinguiſh it from the *vis mortua* ſpoken of before; and by theſe appellations, however different, the ſame thing is underſtood by all mathematicians; namely, that power of diſplacing, of withſtanding oppoſite moving forces, or of overcoming any dead reſiſtance, which reſides in a moving body, and which, in whole or in part, continues to accompany it, ſo long as the body moves. See MECHANICS.

We have ſeveral curious as well as uſeful obſervations in Deſagulier's Experimental Philoſophy, concerning the comparative forces of men and horſes, and the beſt way of applying them. A horſe draws with the greateſt advantage when the line of direction is level with his breaſt; in ſuch a ſituation, he is able to draw 200 lb. eight hours a-day, walking about two miles and an half an hour. And if the ſame horſe is made to draw 240 lb. he can work but ſix hours a-day, and cannot go quite ſo faſt. On a carriage, indeed, where friction alone is to be overcome, a middling horſe will draw 1000 lb. But the beſt way to try a horſe's force, is by making him draw up out of a well, over a ſingle pulley or roller; and in ſuch a caſe, one horſe with another will draw 200 lb. as already obſerved.

Five men are found to be equal in ſtrength to one horſe, and can, with as much eaſe, puſh round the horizontal beam of a mill, in a walk 40 feet wide; whereas three men will do it in a walk only 19 feet wide.

The worſt way of applying the force of a horſe, is to make him carry or draw up hill: for if the hill be ſteep, three men will do more than a horſe, each man climbing up faſter with a burden of 100 lb. weight, than a horſe that is loaded with 300 lb. a difference which is owing to the poſition of the parts of the human body being better adapted to climb than thoſe of a horſe.

On the other hand, the beſt way of applying the force of a horſe, is an horizontal direction, wherein a man can exert leaſt force: thus a man, weighing 140 lb. and drawing a boat along by means of a rope coming over his ſhoulders, cannot draw above 27 lb. or exert above one-ſeventh part of the force of a horſe employed to the ſame purpoſe.

The very beſt and moſt effectual poſture in a man, is that of rowing; wherein he not only acts with more muſcles at once for overcoming the reſiſtance, than in any other poſition; but as he pulls backwards, the weight of his body aſſiſts by way of lever. See Deſaguliers, Exp. Phil. vol. i. p. 241. where we have ſeveral other obſervations relative to force acquired by certain poſitions of the body, from which that author accounts for moſt feats of ſtrength and activity. See alſo a *Memoire* on this ſubject by M. de la Hire, in Mem. Roy. Acad. Sc. 1629; or in Deſaguliers, Exp. &c. p. 267, &c. who has publiſhed a tranſlation of part of it with remarks.

Force || Forcible.

FORCE, in law, ſignifies any unlawful violence offered to things or perſons, and is divided into ſimple and compound. *Simple force* is what is ſo committed, that it has no other crime attending it; as where a perſon by force enters on another's poſſeſſion, without committing any other unlawful act. *Compound force*, is where ſome other violence is committed with ſuch an act which of itſelf alone is criminal; as if one enters by force into another's houſe, and there kills a perſon, or raviſhes a woman. There is likewiſe a force implied in law, as in every treſpaſs, reſcue, or diſſeiſin, and an actual force with weapons, number of perſons, &c.—Any perſon may lawfully enter a tavern, inn, or victualling-houſe; ſo may a landlord his tenant's houſe to view repairs, &c. But if, in theſe caſes, the perſon that enters commits any violence or force, the law will intend that he entered for that purpoſe.

FORCEPS, in ſurgery, &c. a pair of ſciſſars for cutting off, or dividing, the fleſhy membranous parts of the body; as occaſion requires. See SURGERY.

FORCIBLE ENTRY, is a violent and actual entry into houſes or lands; and a forcible detainer, is where one by violence with-holds the poſſeſſion of lands, &c. ſo that the perſon who has a right of entry is barred, or hindered, therefrom.

At common law, any perſon that had a right to enter into lands, &c. might retain poſſeſſion of it by force. But this liberty being abuſed, to the breach of the peace, it was therefore found neceſſary that the ſame ſhould be reſtrained: Though, at this day, he who is wrongfully diſpoſſeſſed of goods may by force retake them. By ſtatute, no perſons ſhall make an entry on any lands or tenements, except where it is given by law, and in a peaceable manner, even tho' they have title of entry, on pain of impriſonment: and where a forcible entry is committed, juſtices of peace are authorized to view the place, and enquire of the force by a jury, ſummoned by the ſheriff of the county; and they may cauſe the tenements, &c. to be reſtored, and impriſon the offenders till they pay a fine. Likewiſe a writ of forcible entry lies, where a perſon ſeiſed of freehold, is by force put out thereof.

FORCIBLE Marriage, of a woman of eſtate, is felony. For by the ſtatute 3 H. 7. c. 2. it is enacted, "That if any perſons ſhall take away any woman having lands or goods, or that is heir-apparent to her anceſtor, by force, and againſt her will, and *marry* or *defile* her; the takers, procurers, abettors, and receivers, of the woman taken away againſt her will, and knowing the ſame, ſhall be deemed principal felons; but as to procurers and acceſſories, they are, before the offence be committed, to be excluded the benefit of clergy, by *Jacob's Law Dict.*

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Forcible, Forcing.

39 Eliz. c. 9. The indictment on the ſtatute 3 H. 7, is expreſsly to ſet forth, that the woman taken away had lands or goods, or was heir apparent; and alſo that ſhe was married or defiled, becauſe no other caſe is within the ſtatute; and it ought to allege that the taking was for lucre. It is no excuſe that the woman at firſt was taken away with her conſent: for if ſhe afterwards refuſe to continue with the offender, and be forced againſt her will, ſhe may from that time properly be ſaid to be taken againſt her will; and it is not material whether a woman ſo taken away be at laſt married or defiled with her own conſent or not, if ſhe were under force at the time; the offender being in both caſes equally within the words of the act.

Thoſe perſons who, after the fact, receive the offender, are but acceſſories after the offence, according to the rules of common law; and thoſe that are only privy to the damage, but not parties to the forcible taking away, are not within the act, H. P. C. 119. A man may be indicted for taking away a woman by force in another country; for the continuing of the force in any country, amounts to a forcible taking there. *Ibid.* Taking away any woman-child under the age of 16 years and unmarried, out of the cuſtody and without the conſent of the father or guardian, &c. the offender ſhall ſuffer fine and impriſonment; and if the woman agrees to any contract of matrimony with ſuch perſon, ſhe ſhall forfeit her eſtate during life, to the next of kin to whom the inheritance ſhould deſcend, &c. Stat. 4 & 5. P & M. c. 8. This is a force againſt the parents: and an information will lie for ſeducing a young man or woman from their parents, againſt their conſents, in order to marry them, &c. See MARRIAGE.

FORCING, in gardening, a method of producing ripe fruits from trees before their natural ſeaſon. The method of doing it is this: A wall ſhould be erected ten feet high; a border muſt be marked out on the ſouth ſide of it, of about four feet wide, and ſome ſtakes muſt be faſtened into the ground all along the edge of the border; theſe ſhould be four inches thick. They are intended to reſt the glaſs lights upon, which are to ſlope backwards to the wall, to ſhelter the fruit as there ſhall be occaſion: and there muſt be, at each end, a door to open either way, according as the wind blows. The frame ſhould be made moveable along the wall, that when a tree has been forced one year, the frame may be removed to another, and ſo on, that the trees may each of them be forced only once in three years, at which rate they will laſt a long time. They muſt be always well-grown trees that are choſen for forcing; for young ones are ſoon deſtroyed, and the fruit that is produced from them is never ſo well taſted. The fruits moſt proper for this management are the avant or ſmall white nutmeg, the albemarle, the early newington, and the brown nutmeg peaches; Mr Fairchild's early, and the elrugo and newington nectarines; the maſculine apricot, and the may-duke and may cherry. For grapes, the white and black ſweet-water are the propereſt; and of gooſeberries the Dutch white, the Dutch early green, and the walnut gooſeberry; and the large Dutch white and large Dutch red currants.

The dung, before it is put to the wall, ſhould be laid together in a heap for five or ſix days, that it may heat uniformly through; and when thus prepared it muſt be laid four feet thick at the baſe of the wall, and go ſloping up till it is two feet thick at the top. It muſt be laid at leaſt within three or four inches of the top of the wall; and when it ſinks, as it will ſink two or three feet, more dung muſt be laid on; for the firſt heat will do little more than juſt ſwell the bloſſom-buds. The covering the trees with glaſſes is of great ſervice; but they ſhould be taken off to admit the benefit of gentle ſhowers to the trees, and the doors at the ends ſhould be either left entirely open, or one or both of them opened, and a mat hung before them, at once to let the air circulate and keep off the froſts.

Forcing, Forloun.

The dung is never to be applied till towards the end of November; and three changes of it will be ſufficient to ripen the cherries, which will be very fine in February. As to the apricots, grapes, nectarines, peaches, and plums, if the weather be milder, the glaſſes are to be opened to let in ſunſhine or gentle ſhowers.

If a row or two of ſcarlet ſtrawberries be planted at the back of the frame, they will ripen in February or the beginning of March; the vines will bloſſom in April, and the grapes will be ripe in June.

It ſhould be carefully obſerved, not to place early and late ripening fruits together, becauſe the heat neceſſary to force the late ones will be of great injury to the early ones after they have fruited.

The maſculine apricot will be ripe in the beginning of April, the early nectarines will be ripe about the ſame time, and the forward ſort of plums by the latter end of that month. Gooſeberries will have fruit fit for tarts in January or February, and will ripen in March; and currants will have ripe fruit in April.

The trees need not be planted ſo diſtant as theſe walls as at others, for they do not ſhoot ſo freely as in the open air; nine feet aſunder is ſufficient. They ſhould be pruned about three weeks before the heat is applied.

FORCING, in the wine trade, a term uſed by the wine-coopers for the fining down wines, and rendering them fit for immediate draught. The principal inconvenience of the common way of fining down the white-wines by iſinglaſs, and the red by whites of eggs, is the ſlowneſs of the operation; theſe ingredients not performing their office in leſs than a week, or ſometimes a fortnight, according as the weather proves favourable, cloudy or clear, windy or calm: this appears to be matter of conſtant obſervation. But the wine-merchant frequently requires a method that ſhall, with certainty, make the wines fit for taſting in a few hours. A method of this kind there is, but it is kept in a few hands a valuable ſecret. Perhaps it depends upon a prudent uſe of a tartarized ſpirit of wine, and the common forcing, as occaſion is, along with gypſum, as the principal; all which are to be well ſtirred about in wine, for half an hour before it is ſuffered to reſt.

FORDOUN (John of), the father of Scottiſh hiſtory, flouriſhed in the reign of Alexander III. towards the end of the 13th century. But of his life there is nothing known with certainty, though there was not a monaſtery that poſſeſſed not copies of his work. The firſt five books of the hiſtory which bears his

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Fordwich ... Foreign.

his name were written by him: the reſt were fabricated from materials left by him, and from new collections by different perſons. A manuſcript in vellum of this hiſtorian is in the library of the univerſity of Edinburgh.

FORDWICH, a town of Kent, called in the Doomſday-Book "the little Borough of Fordwich," is a member of the port of Sandwich, and was anciently incorporated by the ſtyle of the Barons of the town of Fordwich, but more lately by the name of the mayor, jurats, and commonalty, who enjoy the ſame privileges as the cinque-ports. This place is famous for excellent trouts in its river Stour.

FORDYCE (David), an elegant and learned writer of the preſent age, was profeſſor of philoſophy in the Mariſchal-college, Aberdeen. He was originally deſigned for the miniſtry; to prepare himſelf for which was the whole aim of his ambition, and for a courſe of years the whole purpoſe of his ſtudies. How well he was qualified to appear in that character, appears from his "Theodorus, a dialogue concerning the art of preaching." After having finiſhed this work, he went abroad on his travels, in order to obtain freſh ſtores of knowledge: but after a ſucceſsful tour through ſeveral parts of Europe, he was unfortunately caſt away in a ſtorm on the coaſt of Holland. Beſides the above work, he wrote Dialogues on Education, 8vo, and a Treatiſe of Moral Philoſophy publiſhed in the Preceptor. The third edition of his Theodorus was publiſhed in London, after his untimely death, by his brother the Rev. Mr James Fordyce, an eminent diſſenting miniſter, in 1755.

FORE, applied to a ſhip, denotes all that part of a ſhip's frame and machinery which lies near the ſtem.

Fore and aft is uſed for the whole ſhip's length, or from end to end.

FORECASTLE *of a Ship*, that part where the foremaſt ſtands. It is divided from the reſt by a bulk-head.

FOREIGN, ſomething extraneous, or that comes from abroad. The word is formed from the Latin *fores*, "doors;" or *foris*, "out of doors;" or *forum*, "market," &c.

Foreign miniſter, foreign prince, foreign goods, &c. are thoſe belonging to other nations. See MINISTER, &c.

Foreign to the purpoſe, ſignifies a thing remote or impertinent.

FOREIGN, in the Engliſh law, is uſed in various ſignifications. Thus,

Foreign Attachment, is an attachment of the goods of foreigners found within a city or liberty, for the ſatisfaction of ſome citizen to whom the foreigner is indebted; or it ſignifies an attachment of a foreigner's money in the hands of another perſon.

Foreign Kingdom, a kingdom under the dominion of a foreign prince.

At the inſtance of an ambaſſador or conſul, any offender againſt the laws here may be ſent for hither from a foreign kingdom to which he hath fled. And, where a ſtranger of Holland, or any foreign country, buys goods at London, for inſtance, and there gives a note under his hand for payment, and then goes away privately into Holland; in that caſe, the ſeller may have a certificate from the lord mayor, on the proof of the ſale and delivery of ſuch goods, whereupon a proceſs will be executed on the party in Holland.

Foreign ... Foreland.

Foreign Oppoſer, or *Appoſer*, an officer in the exchequer that oppoſes or makes a charge on all ſheriffs, &c. of their green wax; that is to ſay, fines, iſſues, amerciaments, recognizances, &c.

Foreign Plea, ſignifies an objection to the judge of the court, by refuſing him as incompetent, becauſe the matter in queſtion is not within his juriſdiction.

Foreign Seaman, ſerving two years on board Britiſh ſhips, whether of war, trade, or privateers, during the time of war, ſhall be deemed natural-born ſubjects.

FOREIGNER, the natural-born ſubject to ſome foreign prince.

Foreigners, though made denizens, or naturalized, are diſabled to bear any office in government, to be of the privy-council, or members of parliament, &c. This is by the acts of the ſettlement of the crown. Such perſons as are not freemen of a city or corporation, are alſo called *foreigners*, to diſtinguiſh them from the members of the ſame.

FOREJUDGER, in law, ſignifies a judgment whereby one is deprived or put by a thing in queſtion.

To be *forejudged the court*, is where an officer or attorney of any court is expelled the ſame for malpractice, or for not appearing to an action on a bill filed againſt him, &c. And where an attorney of the common-pleas is ſued, the plaintiff's attorney delivers the bill to one of the criers of the court, who calls the attorney defendant, and ſolemnly proclaims aloud, that, if he does not appear thereto, he will be forejudged: likewiſe a rule is given by the ſecondary for his appearance: and if the attorney appears not in four days, then the clerk of the warrants ſtrikes ſuch an attorney off the roll of attorneys; after which he becomes liable to be arreſted like any other perſon: but where an attorney is forejudged, he may be reſtored on clearing himſelf from his contumacy, and making ſatisfaction to the plaintiff, &c.

FORELAND, or FORENESS, in navigation, a point of land jutting out into the ſea.

North Foreland, in the iſle of Thanet, Kent, of which it is the N. E. point, is the promontory aſcertained by act of parliament to be the moſt ſouthern part of the port of London, which is thereby extended N. in a right line to the point called the Naſe on the coaſt of Eſſex, and forms that properly called the Mouth of the Thames. A ſea mark was erected here by the Trinity-Houſe corporation at the public expence, which is a round brick-tower, near 80 feet high. The ſea gains ſo much upon the land here by the winds at S. W. that within the memory of ſome that are living above 30 acres of land have been loſt in one place. All veſſels that paſs on the ſouth-ſide of this head-land are ſaid to enter the Channel, which is the name for the narrow ſea between England and France; and all the towns or harbours between London and this place, whether on the Kentiſh or Eſſex ſhore, are called members of the port of London.

South Foreland, in Kent, a head of land forming the eaſt point of the Kentiſh ſhore; and called *South*, in reſpect to its bearing from the other Foreland, which is about ſix miles to the north. Its ſituation

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Fore-locks
||
Foreſt.

is of great ſecurity to the Downs, the road between both, which would be a very dangerous road for ſhips, did not this point break the ſea off, that would otherwiſe come rolling up from the weſt to the Flats or bank of ſands, which for three leagues together and at about a league or a league and a half from the ſhore run parallel with it, and are dry at low water; ſo that theſe two capes breaking all the force of the ſea on the S. E. and S. W. make the Downs accounted a good road, except when the wind blows exceſſive hard from S. E. E. by N. or E. N. E. when ſhips in the Downs are driven from their anchors, and often run a-ſhore, or are forced on the ſands, or into Sandwich bay or Ramſgate pier.

FORE-LOCKS, in the ſea-language, little flat wedges made with iron, uſed at the ends of bolts, to keep them from flying out of their holes.

FORE-MAST of a SHIP, a large round piece of timber, placed in her fore-part or fore-caſtle, and carrying the fore-ſail and fore-top-ſail yards. Its length is uſually $\frac{5}{7}$ of the main-maſt, and the fore-top-gallant-maſt is $\frac{1}{4}$ the length of the fore-top.

FOREMAST-Men, are thoſe on board a ſhip that take in the top-ſails, fling the yards, furl the ſails, bowſe, trice, and take their turn at the helm, &c.

FOREST, in geography, a huge wood; or, a large extent of ground covered with trees. The word is formed of the Latin *foreſta*, which firſt occurs in the capitulars of Charlemagne, and which itſelf is derived from the German *froſt*, ſignifying the ſame thing. Spelman derives it from the Latin *foris reſtat*, by reaſon foreſts are out of towns. Others derive *foreſta* from *feris*, q. d. *Foreſta, quoad ſit tuta ſtatio ferarum*, as being a ſafe ſtation or abode for wild beaſts.

The Caledonian and Hercynian foreſts are famous in hiſtory. The firſt was a celebrated retreat of the ancient Picts and Scots: The latter anciently occupied the greateſt part of Europe; particularly Germany, Poland, Hungary, &c. In Cæſar's time it extended from the borders of Alſatia and Switzerland to Tranſylvania; and was computed 60 days journey long, and 9 broad: ſome parts or cantons thereof are ſtill remaining.

The ancients adored foreſts, and imagined a great part of their gods to reſide therein: temples were frequently built in the thickeſt foreſts; the gloom and ſilence whereof naturally inſpire ſentiments of devotion, and turn mens thoughts within themſelves.

For the like reaſon, the Druids made foreſts the place of their reſidence, performed their ſacrifices, inſtructed their youth, and gave laws therein.

FOREST, in law, is defined, by Manwood, a certain territory of woody grounds and fruitful paſtures, privileged for wild beaſts and fowls of foreſt, chaſe, and warren, to reſt and abide under the protection of the king, for his princely delight; bounded with unremoveable marks and meres, either known by matter of record or preſcription; repleniſhed with wild beaſts of venery or chaſe, with great coverts of vert for the ſaid beaſts; for preſervation and continuance whereof, the vert and veniſon, there are certain particular laws, privileges, and officers.

Foreſts are of ſuch antiquity in England, that, excepting the New-Foreſt in Hampſhire, erected by William the Conqueror, and Hampton Court, erected by Henry VIII. it is ſaid, that there is no record or hiſtory which makes any certain mention of their erection, though they are mentioned by ſeveral writers and in ſeveral of our laws and ſtatutes. Ancient hiſtorians tell us, "that New-foreſt was raiſed by the deſtruction of 22 pariſh-churches, and many villages, chapels, and manors, for the ſpace of 30 miles together, which was attended with divers judgments on the poſterity of William I. who erected it: for William Rufus was there ſhot with an arrow, and before him Richard the brother of Henry I.; and Henry nephew to Robert, the eldeſt ſon of the Conqueror, did hang by the hair of the head in the boughs of the foreſt, like unto Abſalom." *Blount.* Foreſt.

Beſides the New-foreſt, there are 68 other foreſts in England, 13 chaſes, and more than 700 parks: the four principal foreſts are New-foreſt on the ſea, Shirewood-foreſt on the Trent, Dean-foreſt on the Severn, and Windſor-foreſt on the Thames.

A foreſt in the hands of a ſubject is properly the ſame thing with a CHASE; being ſubject to the common law, and not to the foreſt-laws. But a chaſe differs from a foreſt, in that it is not incloſed; and likewiſe, that a man may have a chaſe in another man's ground as well as his own; being indeed the liberty of keeping beaſts of chaſe, or royal game therein, protected even from the owner of the land, with a power of hunting them thereon. See PARK.

The manner of erecting a foreſt is thus: Certain commiſſioners are appointed under the great ſeal, who view the ground intended for a foreſt, and fence it round: this commiſſion being returned into chancery, the king cauſeth it to be proclaimed throughout the county where the land lieth, that it is a foreſt; and prohibits all perſons from hunting there, without his leave. Though the king may erect a foreſt on his own ground and waſte, he may not do it on the ground of other perſons without their conſent; and agreements with them for that purpoſe ought to be confirmed by parliament.

A foreſt, ſtrictly taken, cannot be in the hands of any but the king; for no perſon but the king has power to grant a commiſſion to be juſtice in eyre of the foreſt: yet, if he grants a foreſt to a ſubject, and that on requeſt made in the chancery, that ſubject and his heirs ſhall have juſtices of the foreſt, in which caſe the ſubject has a foreſt in law.

A ſecond property of a foreſt is, the courts thereof. See *FOREST-Courts, infra.*

A third property is the officers belonging to it, as the juſtices, warden, verderer, foreſter, agiſtor, regarder, keeper, bailiff, beadle, &c. See the articles AGISTOR, BAILIFF, FORESTER, &c.

By the laws of the foreſt, the receivers of treſpaſſes in hunting, or killing of the deer, if they know them to be the king's property, are principal treſpaſſers. Likewiſe, if a treſpaſs be committed in a foreſt, and the treſpaſſer dies, after his death, it may be puniſhed in the life-time of the heir, contrary to common law. Our Norman kings puniſhed ſuch as killed deer in any of their foreſts with great ſeverity; alſo in various manners; as by hanging, loſs of limbs, gelding, and putting out eyes. By *magna charta de foreſta*, it is ordained, that no perſon ſhall loſe life or member for killing the king's deer in foreſts, but ſhall be fined; and

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Foreſt. if the offender has nothing to pay the fine, he ſhall be impriſoned a year and a day, and then be delivered, if he can give ſecurity not to offend for the future, &c. 9 *Hen. III. c.* 1.

Before this ſtatute, it was felony to hunt the king's deer; and by a late act, perſons armed and diſguiſed, appearing in any foreſt, &c. if they hunt, kill, or ſteal any deer, &c. are guilty of felony. 9. *Geo. I. c.* 22.

He who has any licence to hunt in a foreſt or chace, &c. is to take care that he does not exceed his authority; otherwiſe he ſhall be deemed a treſpaſſer from the beginning, and be puniſhed for that fact, as if he had no licence. See further, the articles GAME, and *Game-Law*.

Beaſts of the foreſt are, the hart, hind, buck, doe, boar, wolf, fox, hare, &c. The ſeaſons for hunting whereof are as follow, *viz.* that of the hart and buck begins at the feaſt of St John Baptiſt, and ends at Holy-rood day; of the hind and doe, begins at Holy-rood, and continues till Candlemas; of the boar, from Chriſtmas to Candlemas; of the fox begins at Chriſtmas, and continues till Lady-day; of the hare at Michaelmas, and laſts till Candlemas.

FOREST-Courts, courts inſtituted for the government of the king's foreſts in different parts of the kingdom, and for the puniſhment of all injuries done to the king's deer or veniſon, to the vert or greenſwerd, and to the covert in which ſuch deer are lodged. Theſe are the courts of ATTACHMENTS, of REGARD, of SWEINMOTE, and of JUSTICE-SEAT. 1. The court of attachments, woodmote, or forty-days court, is to be held before the verderors of the foreſt once in every forty days; and is inſtituted to inquire into all offenders againſt vert and veniſon: who may be attached by their bodies, if taken with the mainour (or *mainœuvre, à manu*) that is, in the very act of killing veniſon, or ſtealing wood, or in the preparing ſo to do, or by freſh and immediate purſuit after the act is done; elſe they muſt be attached by their goods. And in this forty-days court the foreſters or keepers are to bring in the attachments, or preſentments *de viridi et venatione*; and the verderors are to receive the ſame, and to enrol them, and to certify them under their ſeals to the court of juſtice-ſeat or ſweinmote: for this court can only inquire of, but not convict, offenders. 2. The court of regard, or ſurvey of dogs, is to be holden every third year for the lawing or expeditation of maſtiffs; which is done by cutting off the claws of the fore-feet, to prevent them from running after deer. No other dogs but maſtiffs are to be thus lawed or expeditated, for none other were permitted to be kept within the precincts of the foreſt; it being ſuppoſed that the keeping of theſe, and theſe only, was neceſſary for the defence of a man's houſe. 3. The court of ſweinmote is to be holden before the verderors, as judges, by the ſteward of the ſweinmote, thrice in every year; the ſweins or freeholders within the foreſt compoſing the jury. The principal juriſdiction of this court is, firſt, to inquire into the oppreſſions and grievances committed by the officers of the foreſt; "*de ſuper-oneracionibus foreſtariorum, et aliorum miniſtrorum foreſte; et de eorum oppreſſionibus populo regis illatis*:" and, ſecondly, to receive and try preſentments certified from the court of attachments againſt offences in vert and veniſon. And this court may not only inquire, but convict alſo; which conviction ſhall be certified to the court of juſtice-ſeat under the ſeals of the jury, for this court cannot proceed to judgment. But the principal court is, 4. The court of juſtice-ſeat, which is held before the chief juſtice in eyre, or chief itinerant judge, *capitalis juſtitiarius in itinere*, or his deputy; to hear and determine all treſpaſſes within the foreſt, and all claims of franchiſes, liberties, and privileges, and all pleas and cauſes whatſoever therein ariſing. It may alſo proceed to try preſentments in the inferior courts of the foreſts, and to give judgment upon conviction of the ſweinmote. And the chief juſtice may therefore, after preſentment made or indictment found, but not before, iſſue his warrant to the officers of the foreſt to apprehend the offenders. It may be held every third year; and 40 days notice ought to be given of its ſitting. This court may fine and impriſon for offences within the foreſt, it being a court of record: and therefore a writ of error lies from hence to the court of king's-bench, to rectify and redreſs any mal-adminiſtrations of juſtice; or the chief juſtice in eyre may adjourn any matter of law into the court of king's-bench.

Blackſt. Comment.

FOREST-Laws, are peculiar laws different from the common law of England. Before the making of *Charta de Foreſta*, in the time of king John and his ſon Henry III. confirmed in parliament by 9 Henry III. offences committed therein were puniſhed at the pleaſure of the king in the ſevereſt manner. By this charter, many foreſts were diſafforeſted and ſtripped of their oppreſſive privileges, and regulations were made for the government of thoſe that remained; particularly, killing the king's deer was made no longer a capital offence, but only puniſhed by fine, impriſonment, or abjuration of the realm: yet even in the charter there were ſome grievous articles, which the clemency of later princes have ſince by ſtatute thought fit to alter *per aſſiſas foreſte*. And to this day, in treſpaſſes relating to the foreſt, *voluntas reputabitur pro facto*; ſo that if a man be taken hunting a deer, he may be arreſted as if he had taken a deer.

FOREST-Towns, in geography, certain towns of Suabia in Germany, lying along the Rhine, and the confines of Switzerland, and ſubject to the houſe of Auſtria. Their names are *Rhinefeld, Seckingen, Lauſenburg*, and *Waldſhut*.

Foreſt. Fore-ſtaff.

FORE-STAFF, an inſtrument uſed at ſea for taking the altitudes of heavenly bodies. The fore-ſtaff, called alſo *croſs-ſtaff*, takes its denomination hence, that the obſerver, in uſing it, turns his face towards the object; in contradiſtinction to the back-ſtaff, where he turns his back to the object.

The fore or croſs ſtaff, repreſented in Plate CXCV. conſiſts of a ſtraight ſquare ſtaff, A B, graduated like a line of tangents and four croſſes or vanes, F F, E E, D D, C C, which ſlide thereon. The firſt and ſhorteſt of theſe vanes, F F, is called the *ten croſs*, or *vane*, and belongs to that ſide of the inſtrument whereon the diviſions begin at three degrees and end at ten. The next longeſt vane, E E, is called the *thirty croſs*, belonging to that ſide of the ſtaff wherein the diviſions begin at ten degrees and end at thirty, called the *thirty ſcale*. The next vane, D D, is called the *ſixty croſs*, and belongs to the ſide where the diviſions begin at twenty degrees and end at ſixty. The laſt and longeſt, C C, called the *ninety-croſs*, belongs to the ſide whereon the diviſions begin at thirty degrees and end at ninety.

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Fore-ſtaff || Foreſter.

The great uſe of this inſtrument is to take the height of the ſun and ſtars, or the diſtance of two ſtars: and the ten, thirty, ſixty, or ninety croſſes, are to be uſed according as the altitude is greater or leſs; that is, if the altitude be leſs than ten degrees, the ten croſs is to be uſed; if above ten, but leſs than thirty, the thirty croſs is to be uſed, &c. *Note*, For altitudes greater than thirty degrees, this inſtrument is not ſo convenient as a quadrant or ſemicircle.

To obſerve an altitude by this inſtrument.—Apply the flat end of the ſtaff to your eye, and look at the upper end of the croſs for the centre of the ſun or ſtar, and at the lower end for the horizon. If you ſee the ſky inſtead of the horizon, ſlide the croſs a little nearer the eye; and if you ſee the ſea inſtead of the horizon, ſlide the croſs farther from the eye: and thus continue moving till you ſee exactly the ſun or ſtar's centre by the top of the croſs, and the horizon by the bottom thereof. Then the degrees and minutes, cut by the inner edge of the croſs upon the ſide of the ſtaff peculiar to the croſs you uſe, give the altitude of the ſun or ſtar.

If it be the meridian altitude you want, continue your obſervation as long as you find the altitude increaſe, ſtill moving the croſs nearer to the eye. By ſubtracting the meridian altitude thus found from 90 degrees, you will have the zenith diſtance. To work accurately, an allowance muſt be made for the height of the eye above the ſurface of the ſea, viz. for one Engliſh foot, 1 minute; for 5 feet, $2\frac{1}{2}$; for 10 feet, $3\frac{1}{2}$; for 20 feet, 5; for 40 feet, 7, &c. Theſe minutes ſubtracted from the altitude obſerved, and added to the zenith diſtance obſerved, give the true altitude and zenith diſtance.

To obſerve the diſtance of two ſtars, or the moon's diſtance from a ſtar, by the fore-ſtaff.—Apply the inſtrument to the eye, and looking to both ends of the croſs, move it nearer or farther from the eye till you ſee the two ſtars, the one on the one end and the other on the other end of the croſs; then the degrees and minutes cut by the croſs on the ſide proper to the vane in uſe give the ſtars diſtance.

FORESTALLER, a perſon who is guilty of foreſtalling. See the next article.

FORESTALLING, in law, buying or bargaining for any corn, cattle, victuals, or merchandiſe, in the way as they come to fairs or markets to be ſold, before they get thither, with an intent to ſell the ſame again at a higher price.

The puniſhment for this offence, upon conviction at the quarter-ſeſſions by two or more witneſſes, is, for the firſt time, two months impriſonment and the loſs of the goods, or the value; for the ſecond offence, the offender ſhall be impriſoned ſix months, and loſe double the value of the goods; for the third offence, he ſhall ſuffer impriſonment during the king's pleaſure, forfeit all his goods and chattels, and ſtand on the pillory: but the ſtatute does not extend to maltſters buying barley, or to badgers licenſed.

FORESTER, a ſworn officer of the foreſt, appointed by the king's letters-patent, to walk the foreſt at all hours, and watch over the vert and veniſon; alſo to make attachments and true preſentments of all treſpaſſes committed within the foreſt.

If a man comes into a foreſt in the night, a foreſter cannot lawfully beat him before he makes ſome reſiſtance; but in caſe ſuch a perſon reſiſts the foreſter, he may juſtify a battery. And a foreſter ſhall not be queſtioned for killing a treſpaſſer that, after the peace cried to him, will not ſurrender himſelf, if it be not done on any former malice; though, where treſpaſſers in a foreſt, &c. do kill a perſon that oppoſes them, it is murder in all, becauſe they were engaged in an unlawful act, and therefore malice is implied to the perſon killed. Fore-thought, Forfar.

FORETHOUGHT-FELONY, in Scots law, ſignifies premeditated murder. See MURDER.

FORFAR, a parliament-town of Scotland, and capital of the county of that name, ſituated in N. Lat. 56. 25. W. Long. 2. 32. This town, with Dundee, Cupar, Perth, and St Andrew's, jointly ſend one member to the Britiſh parliament. It ſtands in the great valley of Strathmore that runs from Perth north-eaſt to the ſea, almoſt in a ſtraight line, about 50 miles long and betwixt four and five miles broad, bordered on either ſide by hills, riſing gently on the ſouth ſide, and on the north by the famous Grampians, a little more elevated.

Though hiſtory is ſilent as to the etymology of the name *Forfar*, yet we are ſure it is of very ancient date, and that in the days of old it was the reſidence of royal majeſty. Here Malcom Canmore, a wiſe and magnanimous prince, held his firſt parliament in 1057. The ruins of his palace are ſtill to be ſeen on the top of an artificial mount of a circular form, reſting upon a baſe of about three acres of ground, and riſing 50 feet high above the level of the circumambient plain. A wall of ſtone of a great thickneſs, ſo ſtrongly cemented with run-lime that it is ſcarce poſſible to break the cement with the ſtroke of a hammer, environed the place; and a moat of at leaſt 20 feet broad, and in ſome parts a great deal more, and 12 feet deep, encompaſſed the whole. Adjoining to this is a field of about ſix acres of ground called the *Queen's Manor*, ſurrounded in thoſe days with a large ſheet of water, and acceſſible only by boats. In clearing away ſome of the rubbiſh of the palace a few years ago, a tea-kettle of a conical figure, and a bunch of barbed arrows, were found in the ruins. A pit of about 18 feet deep, very prettily built of hewn ſtone, with a human body in a ſtate of extreme putrefaction, was alſo diſcovered. The lake of Forfar, ſtretching two miles in length from eaſt to weſt, and half a mile in breadth, and covering the palace on the north, afforded not only a plentiful ſupply of water for every purpoſe, but alſo added to the ſtrength of the place. This lake abounds with trout, pike, perch, and eel. Of late years it has been greatly reduced by draining; to which the immenſe quantity of fine marle at the bottom was the principal inducement. This excellent manure is found here in large ſtrata from two to ſix and eight feet deep, and generally below moſs ten feet deep.

This lake has proved fatal to many of the human race; but particularly and deſervedly ſo to the murderers of Malcom II. who having fled after perpetrating the bloody deed at the caſtle of Glammis, about five miles diſtant, in the year 1036, miſſed their way, owing to a deep fall of ſnow, and wandered in the fields for ſome time, till at laſt they came upon the ice on the lake, which not being firm, ſuddenly gave way under them, and they all periſhed. When the thaw

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Forfar. came, their bodies were found; and being diſcovered to be the murderers of the king, they were all hung on gibbets on the ſides of the highways.

Within this lake were formerly two iſlands raiſed by art, with buildings on each; to which Margaret, Malcom Canmore's queen, retired after the deceaſe of her huſband. Part of the ruins of theſe edifices are ſtill to be ſeen. To this queen, tradition ſays, we owe the cuſtom of the grace-drink; ſhe having eſtabliſhed it as a rule at her table, that whoever ſtaid till grace was ſaid was rewarded with a bumper.

From this time we have little or no accounts of Forfar till the middle of the 17th century, except an act paſſed in the 13th parliament of James VI. 21ſt July 1593, in the following words: "Our ſoveraine Lorde, underſtanding that be acte and ordinance maid anent obſervation of the Sabbath-daie within this realme, the mercatte-daie of the burgh of Forfare, being the head burgh of the ſchire, quhilk was Sundaie, is taken from them; and his hieneſſe not willing that they in onie waies ſuld be prejudged hereby, therefore his hieneſſe, with adviſe of the eſtaites of this preſent parliament, alteris and changis their ſaid mercatte-daie from Sundaie to Fridaie, and willis the ſamen Fridaie onkly to be their mercatte daie to them in all times hereafter; and the ſamin to ſtande with the like priviledges and freedomes as the Sundaie did of before." Whether this change took place, or how long it continued, is uncertain; but the market-day is preſently held on Saturday, and has been ſo paſt memory of man.

During the uſurpation of Oliver Cromwell, a detachment of his forces, after ſacking Dundee, came to Forfar and burnt all the public records of the place; and the only charter the town now has is one granted by Charles II. after his reſtoration, confirming all its ancient rights and privileges.

As an evidence of the ignorance and barbarity of the times, it appears from the records of the trials kept in the charter-cheſt of Forfar, that nine perſons were condemned and burnt here for witchcraft betwixt the years 1650 and 1662. Theſe innocent people were all tried by a ſpecial commiſſion from the lords of the privy-council at Edinburgh; and although the commiſſion expreſsly diſcharged torturing them on purpoſe to extort a confeſſion of their guilt, yet, as it was then thought meritorious to obtain confeſſion of guilt by whatever means, many inhuman cruelties were exerciſed upon the unfortunate objects; particularly, an iron boot was drawn upon one of their legs, and a wedge driven with great force between it and the leg. Another inſtrument, ſtill carefully preſerved here, was likewiſe uſed, and is called the *witch-bridle*. It is made of iron, in the ſhape of a dog's collar, with two pikes on the inſide, about four inches diſtant and two and a half long. Theſe pikes were put into the mouth, and the collar afterwards buckled ſtrait on the back of the head, to which was affixed an iron chain, whereby the condemned perſons were led to the place of execution called the *Play-field*, about a quarter of a mile to the northward of the town.

The inhabitants of Forfar are a hoſpitable, free, and generous ſet of people: they are at leaſt doubled in number within theſe 30 years, being now about 3300: the houſes have alſo increaſed more in proportion, beſides being vaſtly improved. The church here has juſt been rebuilt on an elegant and extenſive plan calculated to contain 2000 hearers. Forfar, Forfeiture.

Forfar Shire, a county of Scotland, of which Forfar is the capital. Including Angus, Glenila, Gleneſk, and Glenpraſſin, it extends 29 miles from eaſt to weſt, and 16 where broadeſt, though in ſome places the breadth does not exceed five miles. On the north it is divided from the Brae of Mar by a ridge of the Binchinin mountains; it is bounded on the ſouth by the Frith of Tay and the Britiſh ocean, on the eaſt by Mearns, and on the weſt by Perthſhire. Part of the Grampian mountains runs through this county, which is agreeably diverſified with hill and dale. It produces lead and iron in abundance, together with quarries of freeſtone and ſlate, with which the inhabitants drive a conſiderable traffic. The county is well watered with lakes, rivers, rivulets, and fountains, ſhaded with large foreſts, roughened with brown mountains, and waved with green hills interſperſed with fields and meadows, and adorned with fine ſeats and plantations. Their heaths and woods abound with hart, hind, roebuck, and moor-game; their ſtreams are ſtocked with trout and ſalmon. Their hills are covered with flocks of ſheep, and their fields afford plentiful harveſts of wheat and all ſorts of grain. The mountains to the weſt and north are inhabited by Highlanders: but the Lowlanders poſſeſs the towns and champaign country, and are remarkable for their politeneſs and hoſpitality.

FORFEITURE, originally ſignifies a tranſgreſſion, or offence againſt ſome penal law. The word is formed of the baſe Latin *foriſfactura*: whence *forfaitura* and *forfaicture*, and the French *forfait*. *Foriſfactura* comes of *foriſfacere*; which, according to Iſidore, ſignifies to "hurt or offend," *facere contra rationem*; and which is not improbably derived of *foris* "out," and *facere*, "to do," q. d. an action out of rule, or contrary to the rules. Borel will have *forfait* derived from the uſing of force or violence: Lobineau in his gloſſary will have *foriſfacta* properly to ſignify a mulct or amend, not a *forfeit*; which latter he derives from the baſe Britiſh *forfed*, "a penalty."

But, with us, it is now more frequently uſed for the effect of ſuch tranſgreſſion; or the loſing ſome right, privilege, eſtate, honour, office, or effects, in conſequence thereof; than for the tranſgreſſion itſelf.

Forfeiture differs from *confiſcation*, in that the former is more general; while confiſcation is particularly applied to ſuch things as become forfeited to the king's exchequer; and goods confiſcated are ſaid to be ſuch as nobody claims.

Forfeitures may be either in *civil* or *criminal* caſes.

I. With reſpect to the firſt, a man that hath an eſtate for life or years, may forfeit it many ways, as well as by treaſon or felony; ſuch as alienation, claiming a greater eſtate than he hath, or affirming the reverſion to be in a ſtranger, &c. When a tenant in tail makes leaſes not warranted by the ſtatute; a copyholder commits waſte, refuſes to pay his rent, or do ſuit of court; and where an eſtate is granted upon condition, on non-performance thereof, &c. they will make a forfeiture.

Entry for a forfeiture ought to be by him who is next in reverſion, or remainder, after the eſtate forfeited. As if tenant for life or years commits a forfeiture, he who has the immediate reverſion or remainder ought

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Forfeiture. ought to enter; though he has the fee, or only an eſtate-tail.

II. Forfeiture in criminal caſes is twofold; of real, and perſonal eſtates.

1. As to real eſtates, by ATTAINDER in high-treaſon, a man forfeits to the king all his lands and tenements of inheritance, whether fee-ſimple or fee-tail; and all his rights of entry on lands and tenements, which he had at the time of the offence committed, or at any time afterwards, to be for ever veſted in the crown; and alſo the profits of all lands and tenements, which he had in his own right for life or years, ſo long as ſuch intereſt ſhall ſubſiſt. This forfeiture relates backwards to the time of the treaſon committed; ſo as to avoid all intermediate ſales and incumbrances, but not thoſe before the fact: and therefore a wife's jointure is not forfeitable for the treaſon of her huſband; becauſe ſettled upon her previous to the treaſon committed. But her dower is forfeited, by the expreſs proviſion of ſtatute 5 and 6 Edw. VI. c. 11. And yet the huſband ſhall be tenant by the curteſy of the wife's lands, if the wife be attainted of treaſon: for that is not prohibited by the ſtatute. But, though after attainder the forfeiture relates back to the time of the treaſon committed, yet it does not take effect unleſs an attainder be had, of which it is one of the fruits; and therefore, if a traitor dies before judgment pronounced, or is killed in open rebellion, or is hanged by martial law, it works no forfeiture of his lands: for he never was attainted of treaſon. But if the chief juſtice of the king's bench (the ſupreme coroner of all England) in perſon, upon the view of the body of him killed in open rebellion, records it and returns the record into his own court, both lands and goods ſhall be forfeited.

Blackſt. Comment.

The natural juſtice of forfeiture or confiſcation of property, for treaſon, is founded on this conſideration: That he who hath thus violated the fundamental principles of government, and broken his part of the original contract between king and people, hath abandoned his connections with ſociety, and hath no longer any right to thoſe advantages which before belonged to him purely as a member of the community; among which *ſocial* advantages, the right of transferring or tranſmitting property to others is one of the chief. Such forfeitures, moreover, whereby his poſterity muſt ſuffer as well as himſelf, will help to reſtrain a man, not only by the ſenſe of his duty, and dread of perſonal puniſhment, but alſo by his paſſions and natural affections; and will intereſt every dependent and relation he has to keep him from offending: according to that beautiful ſentiment of Cicero, "*nec vero me fugit quam ſit acerbum, parentum ſcelera filiorum pœnis lui: ſed hoc præclare legibus comparatum eſt, ut caritas liberorum amiciores parentes reipublicæ redderet.*" And therefore Aulus Caſcellius, a Roman lawyer in the time of the triumvirate, uſed to boaſt that he had two reaſons for deſpiſing the power of the tyrants; his old age and his want of children: for children are pledges to the prince of the father's obedience. Yet many nations have thought, that this poſthumous puniſhment favours of hardſhip to the innocent; eſpecially for crimes that do not ſtrike at the very root and foundation of ſociety, as treaſon againſt the government expreſsly does. And therefore, although confiſcations were very frequent in the times of the earlier emperors, yet Arcadius and Honorius, in every other inſtance but that of treaſon, thought it more juſt, *ibi eſſe pœnam, ubi et noxa eſt*; and ordered, that "*peccata ſuos teneant auctores, nec ulterius progrediatur metus, quam reperiatur delictum:*" and Juſtinian alſo made a law to reſtrain the puniſhment of relations; which directs the forfeiture to go, except in the caſe of *crimen majeſtatis*, to the next of kin to the delinquent. On the other hand, the Macedonian laws extended even the capital puniſhment of treaſon, not only to the children, but to all the relations of the delinquent: and of courſe their eſtates muſt be alſo forfeited, as no man was left to inherit them. And in Germany, by the famous golden bull (copied almoſt *verbatim* from Juſtinian's code), the lives of the ſons of ſuch as conſpire to kill an elector are ſpared, as it is expreſſed, by the emperor's *particular bounty*. But they are deprived of all their effects and rights of ſucceſſion, and are rendered incapable of any honour eccleſiaſtical and civil: to the end that, being always poor and neceſſitous, they may for ever be accompanied by the infamy of their father; may languiſh in continual indigence; and may find (ſays this mercileſs edict) their puniſhment in living, and their relief in dying."

Forfeiture.

In England, forfeiture of lands and tenements to the crown for treaſon is by no means derived from the feodal policy, but was antecedent to the eſtabliſhment of that ſyſtem in this iſland; being tranſmitted from our Saxon anceſtors, and forming a part of the ancient Scandinavian conſtitution. But in certain treaſons relating to the coin (which ſeem rather a ſpecies of the *crimen falſi* than the *crimen læſæ majeſtatis*), it is provided by ſome of the modern ſtatutes which conſtitute the offence, that it ſhall work no forfeiture of lands, ſave only for the life of the offenders; and by all, that it ſhall not deprive the wife of her dower. And, in order to aboliſh ſuch hereditary puniſhment entirely, it was enacted by ſtatute 7 Ann. c. 21. that, after the deceaſe of the late pretender, no attainder for treaſon ſhould extend to the diſinheriting of any heir, nor to the prejudice of any perſon, other than the traitor himſelf. By which the law of forfeitures for high treaſon would by this time have been at an end, had not a ſubſequent ſtatute intervened to give them a longer duration. The hiſtory of this matter is ſomewhat ſingular, and worthy obſervation. At the time of the union, the crime of treaſon in Scotland was, by the Scots law, in many reſpects different from that of treaſon in England; and particularly in its conſequence of forfeitures of entailed eſtates, which was more peculiarly Engliſh: yet it ſeemed neceſſary, that a crime ſo nearly affecting government ſhould, both in its eſſence and conſequences, be put upon the ſame footing in both parts of the united kingdoms. In new-modelling theſe laws, the Scots nation and the Engliſh houſe of commons ſtruggled hard, partly to maintain, and partly to acquire, a total immunity from forfeiture and corruption of blood: which the houſe of lords as firmly reſiſted. At length a compromiſe was agreed to, which is eſtabliſhed by this ſtatute, *viz.* that the ſame crimes, and no other, ſhould be treaſon in Scotland that are ſo in England; and that the Engliſh forfeitures and corruption of blood ſhould take place in Scotland till the death of the then pretender, and then ceaſe throughout the whole of Great Britain: the lords artfully propoſing this temporary clauſe, in hopes (it

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Forfeiture — is ſaid) that the prudence of ſucceeding parliaments would make it perpetual. This has partly been done by the ſtatute 17 Geo. II. c. 39. (made in the year preceding the late rebellion), the operation of theſe indemnifying clauſes being thereby ſtill farther ſuſpended till the death of the ſons of the pretender.

In petit treaſon and felony, the offender alſo forfeits all his chattel intereſts abſolutely, and the profits of all freehold eſtates during life; and after his death all his lands and tenements in fee ſimple (but not thoſe in tail) to the crown, for a very ſhort period of time: for the king ſhall have them for a year and a day, and may commit therein what waſte he pleaſes; which is called the king's *year*, *day*, and *waſte*. Formerly the king had only a liberty of committing waſte on the lands of felons, by pulling down their houſes, extirpating their gardens, ploughing their meadows, and cutting down their woods. And a puniſhment of a ſimilar ſpirit appears to have obtained in the oriental countries, from the decrees of Nebuchadnezzar and Cyrus in the books of Daniel and Ezra; which, beſides the pain of death inflicted on the delinquents there ſpecified, ordain, "that their houſes ſhall be made a dunghill." But this tending greatly to the prejudice of the public, it was agreed in the reign of Henry I. in England, that the king ſhould have the profits of the land for one year and a day in lieu of the deſtruction he was otherwiſe at liberty to commit: and therefore *magna charta* provides, that the king ſhall only hold ſuch lands for a year and a day, and then reſtore them to the lord of the fee, without any mention made of waſte. But the ſtatute 17 Edw. II. *de prerogativa regis*, ſeems to ſuppoſe, that the king ſhall have his year, day, *and* waſte; and not the year and day *inſtead of* waſte: which Sir Edward Coke (and the author of the Mirror before him) very juſtly look upon as an encroachment, though a very ancient one, of the royal prerogative. This year, day, and waſte, are now uſually compounded for; but otherwiſe they regularly belong to the crown; and after their expiration the land would naturally have deſcended to the heir (as in gavelkind tenure it ſtill does), did not its feodal quality intercept ſuch deſcent, and give it by way of eſcheat to the lord. Theſe forfeitures for felony do alſo ariſe only upon attainder; and therefore a *felo de ſe* forfeits no lands of inheritance or freehold, for he never is attainted as a felon. They likewiſe relate back to the time the offence was committed as well as forfeitures for treaſon, ſo as to avoid all intermediate charges and conveyances. This may be hard upon ſuch as have unwarily engaged with the offender: but the cruelty and reproach muſt lie on the part, not of the law, but of the criminal; who has thus knowingly and diſhoneſtly involved others in his own calamities.

2. The forfeiture of goods and chattels accrues in every one of the high kinds of offence; in high treaſon, or miſpriſon thereof, petit treaſon, felonies of all ſorts whether clergyable or not, ſelf-murder or felony *de ſe*, petty larceny, ſtanding mute, &c. For flight alſo, on an accuſation of treaſon, felony, or even petit larceny, whether the party be found guilty or acquitted, if the jury find the flight, the party ſhall forfeit his goods and chattels: for the very flight is an offence, carrying with it a ſtrong preſumption of guilt, and is at leaſt an endeavour to elude and ſtifle the courſe of juſtice preſcribed by the law. But the jury very ſeldom find the flight; forfeiture being looked upon, ſince the vaſt increaſe of perſonal property of late years, as too large a penalty for an offence to which a man is prompted by the natural love of liberty. Forfeiture ‖ Forficula.

There is a remarkable difference or two between the forfeiture of lands and of goods and chattels. (1.) Lands are forfeited upon *attainder*, and not before: goods and chattels are forfeited by *conviction*. Becauſe in many of the caſes where goods are forfeited, there never is any attainder; which happens only where judgment of death or outlawry is given: therefore, in thoſe caſes, the forfeiture muſt be upon conviction, or not at all; and, being neceſſarily upon conviction in thoſe, it is ſo ordered in all other caſes, for the law loves uniformity. (2.) The forfeiture of lands has relation to the time the fact was committed, ſo as to avoid all ſubſequent ſales and incumbrances: but the forfeiture of goods and chattels has no relation backwards; ſo that thoſe only which a man has at the time of conviction ſhall be forfeited. Therefore a traitor or felon may *bona fide* ſell any of his chattels, real or perſonal, for the ſuſtenance of himſelf and family between the fact and conviction: for perſonal property is of ſo fluctuating a nature, that it paſſes through many hands in a ſhort time; and no buyer could be ſafe, if he were liable to return the goods which he had fairly bought, provided any of the prior vendors had committed a treaſon or felony. Yet if they be colluſively and not *bona fide* parted with, merely to defraud the crown, the law (and particularly the ſtatute 13 Eliz. c. 5.) will reach them; for they are all the while truly and ſubſtantially the goods of the offender: and as he, if acquitted, might recover them himſelf, as not parted with for a good conſideration; ſo, in caſe he happens to be convicted, the law will recover them for the king.

FORFEX, in Roman antiquity, was a way of drawing up an army in the form of a pair of ſheers. It was intended to receive the *cuneus* or wedge, if the enemy ſhould make uſe of that figure. For when the forfex opened to admit the wedge, they had an opportunity of defeating their deſign, and cutting them in pieces.

FORFICULA, the EAR-WIG, in zoology, a genus of inſects belonging to the order of coleoptera. The antennæ are briſtly; the elytra are dimidiated; the wings are covered; and the tail is forked. There are two ſpecies, *viz.* the auricularia, or common ear-wig, with the tops of the elytra white; and the minor, with teſtaceous and unſpotted elytra.—This genus of inſects is one of the beſt known, the forceps at the extremity of their abdomen forming a very diſtinctive character. It is this ſeeming weapon that has occaſioned thoſe inſects to be called *forficulæ* in Latin; and the formidable name of *ear-wigs* has been given them in Engliſh, from a notion that the inſect frequently introduces itſelf into the ears, cauſing great pain, and even death. Mr Barbut, however, aſſures us, that the forceps which the ear-wig carries at his tail, and with which he ſeems provided for his defence, is not ſo formidable as it at firſt appears, being deſtitute of ſtrength ſufficient to produce the leaſt ſenſible impreſſion. The larva of the ear-wig differs very little from the perfect inſect.

Ear-

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Forge. Ear-wigs are very miſchievous vermin in gardens, eſpecially where carnations are preſerved; for they are ſo fond of theſe flowers, that if care is not taken to prevent them, they will entirely deſtroy them, by eating off the ſweet part at the bottom of the petals or leaves. To prevent which, moſt people have ſtands erected, which have a baſon of earth or lead round each ſupporter, which is conſtantly kept filled with water. Others hang the hollow claws of crabs and lobſters upon ſticks in divers parts of the garden into which thoſe vermin get; and by often ſearching them, you will deſtroy them without much trouble, which will be of great ſervice to your wall-fruit, for theſe are great deſtroyers alſo of all ſoft fruits.

FORGE, properly ſignifies a little furnace, wherein ſmiths and other artificers of iron or ſteel, &c. heat their metals red-hot, in order to ſoften them and render them more malleable and manageable on the anvil.

An ordinary forge is nothing but a pair of bellows, the nozzle of which is directed upon a ſmooth area, on which coals are placed. The nozzle of a pair of bellows may be alſo directed to the bottom of any furnace, to excite the combuſtion of the coals placed there, by which a kind of forge is formed. In laboratories, there is generally a ſmall furnace conſiſting of one cylindrical piece, open at top, which has at its lower ſide a hole for receiving the nozzle of a double bellows. This kind of forge-furnace is very convenient for fuſions, as the operation is quickly performed, and with few coals. In its lower part, two inches above the hole for receiving the nozzle of the bellows, may be placed an iron-plate of the ſame diameter, ſupported upon two horizontal bars, and pierced near its circumference with four holes diametrically oppoſite to each other. By this diſpoſition, the wind of the bellows, puſhed forcibly under this plate, enters at theſe four holes; and thus the heat of the fire is equally diſtributed, and the crucible in the furnace is equally ſurrounded by it. This contrivance is uſed in the forge-furnaces for melting copper, with this difference only, that theſe furnaces are ſquare, which is a matter of no conſequence.

As the wind of bellows ſtrongly and rapidly excites the action of the fire, a forge is very convenient when a great heat is to be applied quickly: but it is not ſuitable when the heat is to be gradually increaſed.

The forge, or blaſt of bellows, is uſed in ſeveral operations in ſmall; as to fuſe ſalts, metals, ores, &c. It is alſo much uſed in works in the great, which require ſtrong heat, without much management; and chiefly in the ſmelting of ores, and fuſion of metallic matters.

FORGE is alſo uſed for a large furnace, wherein iron-ore, taken out of the mine, is melted down: or it is more properly applied to another kind of furnace, wherein the iron-ore, melted down and ſeparated in a former furnace, and then caſt into ſows and pigs, is heated and fuſed over again, and beaten afterwards with large hammers, and thus rendered more ſoft, pure, ductile, and fit for uſe.

FORGE, in the train of artillery, is generally called a *travelling forge*, and may not be improperly called a portable ſmith's ſhop: at this forge all manner of ſmith's work is made, and it can be uſed upon a march as well as in camp. Formerly they were very ill contrived, with 2 wheels only, and wooden ſupporters to prop the forge for working when in the park. Of late years they are made with 4 wheels, which anſwers their purpoſe much better. Forge ‖ Forgery.

FORGE for red-hot Balls, is a place where the balls are made red-hot before they are fired off: it is built about five or ſix feet below the ſurface of the ground, of ſtrong brick-work, and an iron grate, upon which the balls are laid, with a very large fire under them.

FORGER, in law, one guilty of FORGERY.

FORGERY (from the French *forger*, i. e. *accudare*, *fabricare*, "to beat on an anvil, forge, or form,") may be defined at common law, to be "the fraudulent making or alteration of a writing to the prejudice of another man's right:" for which the offender may ſuffer fine, impriſonment, and pillory. And alſo, by a variety of ſtatutes, a more ſevere puniſhment is inflicted on the offender in many particular caſes, which are ſo multiplied of late as almoſt to become general. We ſhall mention the principal inſtances.

By ſtatute 5 Eliz. c. 14. to forge or make, or knowingly to publiſh or give in evidence, any forged deed, court-roll, or will, with intent to affect the right of real property, either freehold or copyhold, is puniſhed by a forfeiture to the party grieved of double coſts and damages; by ſtanding in the pillory, and having both his ears cut off, and his noſtrils ſlit, and ſeared; by forfeiture to the crown of the profits of his lands, and by perpetual impriſonment. For any forgery relating to a term of years or annuity, bond, obligation, acquittance, releaſe, or diſcharge of any debt or demand of any perſonal chattels, the ſame forfeiture is given to the party grieved; and on the offender is inflicted the pillory, loſs of one of his ears, and half a year's impriſonment: the ſecond offence, in both caſes, being felony without benefit of clergy.

Beſides this general act, a multitude of others, ſince the revolution (when paper-credit was firſt eſtabliſhed), have inflicted capital puniſhment on the forging, altering, or uttering as true when forged, of any bank bills or notes, or other ſecurities; of bills of credit iſſued from the exchequer; of ſouth-ſea bonds, &c.; of lottery tickets or orders; of army or navy debentures; of Eaſt India bonds; of writings under ſeal of the London or royal-exchange aſſurance; of the hand of the receiver of the pre-fines, or of the accountant-general and certain other officers of the court of chancery; of a letter of attorney or other power to receive or transfer ſtock or annuities; and on the perſonating a proprietor thereof, to receive or transfer ſuch annuities, ſtock, or dividends: alſo on the perſonating, or procuring to be perſonated, any ſeaman or other perſon, intitled to wages or other naval emoluments, or any of his perſonal repreſentatives; and the taking, or procuring to be taken, any falſe oath in order to obtain a probate or letters of adminiſtration, in order to receive ſuch payments; and the forging, or procuring to be forged, and likewiſe the uttering or publiſhing, as true, of any counterfeited ſeaman's will or power: to which may be added, though not ſtrictly reducible to this head, the counterfeiting of Mediterranean paſſes, under the hands of the lords of the admiralty, to protect one from the piratical ſtates of Barbary; the forging or imitating of any ſtamps to defraud the public revenue: and the forging of any marriage regiſter or licence: all which are, by diſtinct acts of parliament,

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Forging. liament, made felonies without benefit of clergy. By ſtatutes 13 Geo. III. c. 52. & 59. forging or counterfeiting any ſtamp or mark to denote the ſtandard of gold and ſilver plate, and certain other offences of the like tendency, are puniſhed with tranſportation for 14 years. By ſtatute 12 Geo. III. c. 48. certain frauds on the ſtamp-duties, therein deſcribed, principally by uſing the ſame ſtamps more than once, are made ſingle felony, and liable to tranſportation for ſeven years. And the ſame puniſhment is inflicted by ſtatute 13 Geo. III. c. 38. on ſuch as counterfeit the common ſeal of the corporation for manufacturing plate-glaſs (thereby erected), or knowingly demand money of the company by virtue of any writing under ſuch counterfeit ſeal.

There are alſo two other general laws, with regard to forgery; the one 2 Geo. II. c. 25. whereby the firſt offence in forging or procuring to be forged, acting or aſſiſting therein, or uttering or publiſhing as true, any forged deed, will, bond, writing obligatory, bill of exchange, promiſſory note, indorſement or aſſignment thereof, or any acquittance or receipt for money or goods, with intention to defraud any perſon (or corporation), is made felony without benefit of clergy. And by ſtatute 7 Geo. II. c. 22. it is equally penal to forge, or cauſe to be forged, or utter as true, a counterfeit acceptance of a bill of exchange, or the number of any accountable receipt for any note, bill, or any other ſecurity for money, or any warrant or order for the payment of money, or delivery of goods. So that, through the number of theſe general and ſpecial proviſions, there is now hardly a caſe poſſible to be conceived, wherein forgery, that tends to defraud, whether in the name of a real or fictitious perſon, is not made a capital crime.

FORGING, in law, the act of FORGERY.

FORGING, in ſmithery, the beating or hammering iron on the anvil, after having firſt made it red-hot in the forge, in order to extend it into various forms, and faſhion it into works. See FORGE.

There are two ways of forging and hammering iron. One is by the force of the hand, in which there are uſually ſeveral perſons employed, one of them turning the iron and hammering likewiſe, and the reſt only hammering. The other way is by the force of a water-mill, which raiſes and works ſeveral huge hammers beyond the force of man; under the ſtrokes whereof the workmen preſent large lumps or pieces of iron, which are ſuſtained at one end by the anvils, and at the other by iron-chains faſtened to the cieling of the forge. See MILL.

This laſt way of forging is only uſed in the largeſt works, as anchors for ſhips, &c. which uſually weigh ſeveral thouſand pounds. For the lighter works, a ſingle man ſerves to hold, heat, and turn with one hand, while he hammers with the other.

Each purpoſe the work is deſigned for requires its proper heat; for if it be too cold, it will not feel the weight of the hammer, as the ſmiths call it when it will not batter under the hammer; and if it be too hot, it will read-ſear, that is, break or crack under the hammer.

The ſeveral degrees of heat the ſmiths give their irons, are, firſt, a blood-red heat; ſecondly, a white-flame-heat; and, thirdly, a ſparkling or welding heat.

FORISFAMILIATION, in law. When a child, upon receiving a portion from his father, or otherwiſe, renounces his legal title to any further ſhare of his father's ſucceſſion, he is ſaid to be *foriſfamiliated*. Forſifamiliation || Form.

FORK, a well-known inſtrument, conſiſting of a handle and blade, divided at the end into two or more points or prongs.

The *pitch-fork* is a large utenſil of this conſtruction, employed in hay-making, &c.

The *table-fork*, an inſtrument now ſo indiſpenſable, did not come into uſe in England till the reign of James I. as we learn from a remarkable paſſage in Coryat. The reader will probably ſmile at the ſolemn manner in which this important diſcovery or innovation is related: "Here I will mention a thing that might have been ſpoken of before in diſcourſe of the firſt Italian towns. I obſerved a cuſtom in all thoſe Italian cities and townes through the which I paſſed, that is not uſed in any other country that I ſaw in my travels, neither do I thinke that any other nation of Chriſtendome doth uſe it, but only Italy. The Italian and alſo moſt ſtrangers that are commonant in Italy, doe always at their meals uſe a little forke when they eat their meate; for while with their knife which they hold in one hand they cut the meate out of the diſh, they faſten the fork which they hold in the other hand upon the ſame diſh, ſo that whatſoever he be that ſitting in the company of any others at meale ſhould unadviſedly touch the diſh of meat with his fingers from which all the table doe cut, he will give occaſion of offence unto the company as having tranſgreſſed the lawes of good manners, in ſo much that for his error he ſhall be at leaſt brow-beaten if not reprehended in wordes. This form of feeding I underſtand is generally uſed in all parts of Italy, their forkes for the moſt part being made of yronn, ſteele, and ſome of ſilver, but thoſe are uſed only by gentlemen. The reaſon of this their curioſity is, becauſe the Italian cannot by any means indure to have his diſh touched with fingers, ſeeing all mens fingers are not alike cleane. Hereupon I myſelf thought good to imitate the Italian faſhion by this forked cutting of meate, not only while I was in Italy, but alſo in Germany, and often times in England ſince I came home: being once quipped for that frequently uſing my forke, by a certain learned gentleman a familiar friend of mine, Mr Lawrence Whitaker; who in his merry humour doubted not to call me a table *Furcifer*, only for uſing a forke at feeding, but for no other cauſe."

FORLI, an ancient and conſiderable town of Italy, and capital of a territory of the ſame name, in Romagna, with a biſhop's ſee. The public ſtructures are very handſome; and it is ſeated in a fertile, healthy, and pleaſant country, 10 miles ſouth-eaſt of Faenza, and 45 north-eaſt of Florence. E. Long. 12. 1. N. Lat. 44. 28.

FORLORN-HOPE, in the military art, ſignifies men detached from ſeveral regiments, or otherwiſe appointed, to make the firſt attack in day of battle; or, at a ſiege, to ſtorm the counterſcarp, mount the breach, or the like. They are ſo called from the great danger they are unavoidably expoſed to; but the word is old, and begins to be obſolete.

FORM, in phyſics, denotes the manner of being peculiar to each body; or that which conſtitutes it ſuch

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Form. a particular body, and diſtinguiſhes it from every other.

Mr Harris uſes the term *form* likewiſe in another ſenſe, as an efficient animating principle; to which he ſuppoſes Ovid to refer in the firſt lines of his Metamorphoſis,

In nova fert animus mutatas dicere formas
Corpora——

Theſe animating forms are of themſelves no objects either of the ear or of the eye; but their nature or character is underſtood in this, that were they never to exert their proper energies on their proper ſubjects, the marble on which the ſculptor exerciſes his art would remain for ever ſhapeleſs, and the harp from which the harper calls forth ſounds would remain for ever ſilent.

Thus, alſo, the animating form of a natural body is neither its organization nor its figure, nor any other of thoſe inferior forms which make up the ſyſtem of its viſible qualities; but it is the power, which is yet able to produce, preſerve, and employ theſe. It is the power, which firſt moves, and then conducts that latent proceſs, by which the acorn becomes an oak, and the embryo becomes a man; by which digeſtion is performed in plants and animals, and, which departing, the body ceaſes to live, and its members putrefy; and by which every being produces another like itſelf, and every ſpecies is continued. In animals, it is that higher faculty, which, by employing the organs of ſenſe, peculiar to them as animals, diſtinguiſhes them as ſenſitive beings from vegetables; and it is alſo that more noble faculty, which by its own divine vigour, unaſſiſted perhaps with organs, makes and denominates him a being intellective and rational. So that Mr Harris reckons two ſorts of forms, thoſe which are paſſive elements, and thoſe which are efficient cauſes. And all of them agree in this, that they give to every being its peculiar and diſtinctive character: and on the whole he concludes, that form appears in part to be an element, and in part an efficient cauſe, *i. e.* a cauſe which aſſociates the conſtituent elements of natural ſubſtance, and which employs them, when aſſociated, according to their various and peculiar characters.

The philoſophers generally allow two principles of bodies: *matter*, as the common baſis or ſubſtratum of all; and *form*, as that which ſpecifies and diſtinguiſhes each; and which, added to a quantity of common matter, determines or denominates it this or that; wood, or fire, or aſhes, &c.

Subſtantial forms ſeem to have been firſt broached by the followers of Ariſtotle, who thought matter, under different modes or modifications, not ſufficient to conſtitute different bodies; but that ſomething ſubſtantial was neceſſary to ſet them at a greater diſtance: and thus introduced ſubſtantial forms, on the footing of ſouls, which ſpecify and diſtinguiſh animals. What led to this erroneous notion was the circumſtances of life and death: For obſerving, that, as ſoon as the ſoul was departed out of a man, all motion, reſpiration, nutrition, &c. immediately ceaſed, they concluded, that all theſe functions depended on the ſoul, and conſequently that the ſoul was the form of the animal body, or that which conſtituted it ſuch: that the ſoul was a ſubſtance, independent of matter, no body doubted; and hence the forms of other bodies were concluded equally ſubſtantial. But to this it is anſwered, that though the ſoul be that by which a man is man, and conſequently is the form of the human body, as human; yet it does not follow, that it is properly the form of this body of ours, as it is a body; nor of the ſeveral parts thereof, conſidered as diſtinct from each other: For thoſe ſeveral parts have their proper forms ſo cloſely connected with their matter, that it remains inſeparable therefrom long after the ſoul has quitted the body: thus, fleſh has the form of fleſh, bone of bone, &c. long after the ſoul is removed as well as before. The truth is, the body does not become incapable of performing its accuſtomed functions becauſe the ſoul has deſerted it; but the ſoul takes its leave, becauſe the body is not in a condition to perform its functions. Form.

The ancient and modern corpuſcular philoſophers, therefore, with the Carteſians, exclude the notion of ſubſtantial forms; and ſhow, by many arguments, that the form is only the modus or manner of the body it is inherent in. And as there are only three primary modes of matter, viz, figure, reſt, or motion, with two others ariſing therefrom, viz. magnitude and ſituation, the form of all bodies they hold to conſiſt therein; and ſuppoſe the variations theſe modes are capable of, ſufficient to preſent all the variety obſervable in bodies.

Forms are uſually diſtinguiſhed into *eſſential* and *accidental*.

Eſſential. Though the five modes above mentioned, generally taken, be adventitious; yet to this or that body, *e. gr.* to fire or water, they are eſſential: thus, it is *accidental* to iron, to have this or that magnitude, figure, or ſituation, ſince it might exiſt in different ones; yet to a knife or hammer, the figure, magnitude, and poſition of parts, which conſtitute it a hammer or knife, are eſſential; and they cannot exiſt or be conceived without them. Hence it is inferred, that though there be no ſubſtantial, there are eſſential, forms, whereby the ſeveral ſpecies of bodies become what they are, and are diſtinguiſhed from all others.

Accidental forms, are thoſe really inherent in bodies, but in ſuch manner as that the body may exiſt in all its perfection without them. Such is whiteneſs in a wall, heat in water, a figure of a man in wax, &c.

Form is alſo uſed, in a moral ſenſe, for the manner of being or doing a thing according to rules: thus we ſay, a form of government, a form of argument, &c.

Form, in law, the rules eſtabliſhed and requiſite to be obſerved in legal proceedings.—The formal part of the law, or method of proceeding, cannot be altered but by parliament; for if once theſe outworks were demoliſhed, there would be an inlet to all manner of innovation in the body of the law itſelf.

Form, in carpentery, is uſed to denote the long ſeats or benches in the choirs of churches or in ſchools, for the prieſts, prebends, religious, or ſcholars, to ſit on. Du-Cange takes the name to be derived from hence, that the backs of the ſeats were anciently enriched with figures of painting and ſculpture, called in Latin *formæ et typi*. In the life of St William of Roſchild, we meet with *forma* as ſignifying a ſeat for an eccleſiaſtic, or religious, in a choir; and in that of St Lupi-

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Form ‖ Forman.

Lupicia, we have formula in the ſame ſenſe. In the rule of the monaſtery of St Cæſarea, the nun who preſides over the choir is called *primiceria, vel formari.*

At ſchools, the word *form* is frequently applied to what is otherwiſe termed a *claſs.* See Class.

Form alſo denotes the external appearance or ſurface of a body, or the diſpoſition of its parts, as to the length, breadth, and thickneſs.

Form is alſo uſed among mechanics, for a ſort of mould whereon any thing is faſhioned or wrought.

Printer's Form, an aſſemblage of letters, words, and lines, ranged in order, and ſo diſpoſed into pages by the compoſitor; from which, by means of ink and a preſs, the printed ſheets are drawn.

Every form is incloſed in an iron-chaſe, wherein it is firmly locked by a number of pieces of wood; ſome long and narrow, and others of the form of wedges. There are two forms required for every ſheet, one for each ſide; and each form conſiſts of more or fewer pages according to the ſize of the book.

Hatter's Form, is a large block or piece of wood, of a cylindrical figure; the top thereof rounded, and the bottom quite flat. Its uſe is, to mould or faſhion the crown of the hat, after the matter thereof has been beaten and fulled.

Paper-maker's Form, is the frame or mould wherein the ſheets are faſhioned. See Paper.

FORMA PAUPERIS, in law, is when a perſon has juſt cauſe of ſuit, but is ſo poor that he cannot defray the uſual charges of ſuing at law or in equity; in which caſe, on making oath that he is not worth L.5 in the world, on all his debts being paid, and producing a certificate from ſome lawyer that he has good cauſe of ſuit, the judge will admit him to ſue in *forma pauperis*; that is, without paying any fee to counſellors, attorneys, or clerk: the ſtatute 11 Hen. VII. c. 12. having enacted, that counſel and attorneys, &c. ſhall be aſſigned to ſuch poor perſons *gratis*. Where it appears that any pauper has ſold or contracted for the benefit of his ſuit whilſt it is depending in court, ſuch cauſe ſhall be thenceforth totally diſmiſſed; and a perſon ſuing *in forma pauperis*, ſhall not have a new trial granted him, but is to acquieſce in the judgment of the court.

FORMAL, ſomething belonging to or conſtituting the form of a thing. See Form.

FORMALITY, the quality of a form, or formula; or that which conſtitutes and denominates them ſuch.

Formality, as defined in the ſchools, is any manner wherein a thing is conceived; or a manner in any object, importing a relation to the underſtanding, whereby it may be diſtinguiſhed from another object. Thus, animality and rationality are formalities. The Scottiſts make great uſe of formalities, in oppoſition to the virtualities of the Thomiſts.

Formalities, in matters of law, are frequently uſed for the formulas themſelves, or the rules preſcribed for judiciary proceedings. In contracts of ſtrict law, all the formalities muſt be ſtrictly obſerved: an omiſſion of the leaſt formality may ruin the whole convention.

The term is alſo uſed for a certain order, or decorum to be obſerved.

FORMAN (Andrew), archbiſhop of St Andrew's, earl of Pittenweem, and of Cottingham in England, one of the lords of the regency appointed by the ſtates during the minority of king James V. of Scotland, legate a-latere, primate of all the kingdom of Scotland, and archbiſhop of Bourges in France, was deſcended from the family of the Formans of Hutton in the ſhire of Berwick, and is conſidered to have been one of the beſt ſtateſmen of the age in which he lived. He was employed in 1501, along with Robert Blackader archbiſhop of Glaſgow and Patrick earl of Bothwell, to negociate a match between Ja. IV. of Scotland and Margaret eldeſt daughter of Hen. VII. of England; which next year was ratified by the Scottiſh ambaſſadors. He was afterwards frequently employed as Scots ambaſſador to Rome, England, and France, upon the moſt important occaſions. In 1514 he was tranſlated from the ſee of Moray, to which he had been appointed in 1502, to that of St Andrew's. During the time of his poſſeſſing the former, he was employed as mediator betwixt Pope Julius II. and Louis XII. of France, who were at that time at variance; and he happily ſucceeded in conciliating the difference. Having taken leave of the Pope, he paſſed through France on his return home, where he was kindly received by the king and queen, who beſtowed upon him the biſhopric of Bourges in France, which annually brought him in 400 tons of wine, 10,000 franks of gold, and other ſmaller articles. Beſides all this, he was moſt liberally rewarded by Pope Julius; who promoted him to the archbiſhopric of St Andrew's, as has been already mentioned; conferred on him the two rich abbeys of Dunfermline and Aberbrothic; and made him his legate a-latere. At that time, however, there were two other candidates for the archiepiſcopal ſee. The learned Gavin Douglas biſhop of Dunkeld having been nominated by the queen, had actually taken poſſeſſion of it; but John Hepburn, a bold and factious man, having been preferred by the monks, drove out the officers of Gavin Douglas, and placed a ſtrong garriſon in the caſtle. So great was the power of this man, that when Forman was nominated by the Pope, no perſon could be found who durſt proclaim the bulls for his election. At laſt lord Home, at that time the moſt powerful nobleman in Scotland, was induced, by large promiſes, beſides ſome gifts of great conſequence, among which was the donation of the abbacy of Coldingham to his youngeſt brother David, to undertake the taſk. It was executed at Edinburgh and St Andrew's; to which places lord Home's brother went with 10,000 men; though the doing of it, contrary to Forman's inclination, proved a ſource of much trouble to that nobleman afterwards. The quarrel betwixt Hepburn and Forman, however, was at laſt terminated by the latter ſurrendering the biſhopric of Moray, as well as ſome years revenue of the archbiſhopric itſelf; paying Hepburn alſo 3000 French crowns annually out of his eccleſiaſtical revenues. On the appointment of the duke of Albany to the regency, Hepburn endeavoured to undermine the primate's credit with that nobleman, by repreſenting him as one who had in a manner collected all the money in the country, and who conſequently might endanger the tranquillity of the kingdom. Theſe inſinuations, however, were but little regarded by the regent; and Forman had the good fortune afterwards to make up a

Forman.

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Formation
Formiæ.

difference between him and the nobility, which was likely to be attended with much bloodshed. In 1517 the archbishop was appointed by the states one of the lords of the regency, on occasion of the duke of Albany's going to France. We have already mentioned his embassy to Pope Julius II. In M'Kenzie's lives we are informed that in the collection of the Letters of the Scottish Kings from the year 1505 till the year 1626, in the lawyers library, there is a letter from that pope to king James IV. wherein he not only highly commends Forman, but likewise promises that at the first creation of cardinals he should be made one. This letter is dated the 6th of May 1511: but the pope died before he had an opportunity of performing his promise. In the same collection there is a letter from the duke of Albany to Leo X. Julius's successor, wherein he presses the pope to advance him to the dignity of a cardinal promised him by his predecessor, and to continue him his legate a-latere. Archbishop Forman died in 1521, and was buried at Dunfermline. Dempster says that he wrote a book against Luther, a book concerning the Stoic Philosophy, and a Collection out of the Decretals.

FORMATION, in philosophy, an act whereby something is formed or produced.—For the formation of the fœtus in the womb, see ANATOMY, nº 109, 110.

Formation of Stones. See STONE.

Formation of Metals and Minerals. See METAL and MINERAL.

FORMATION, in grammar, signifies the manner of forming one word from another: thus *accountantship* is formed from *accountant*, and this last from *account*.

FORMEDON, in law, (breve *de forma donationis*), a writ that lies for a person who has a right to lands or tenements, by virtue of any entail, arising from the statute of Westm. 2 Ch. II.

This writ is of three kinds, viz. a descender, remainder, and reverter. Formedon in *descender*, lies where a tenant in tail infeoffs a stranger, or is disseised and dies, and the heir may bring this writ to recover the lands. Formedon in *remainder*, lies where a man gives lands, &c. to a person in tail, and, for default of issue of his body, the remainder to another in tail: here if the tenant in tail die without issue, and a stranger abates and enters into the land, he in remainder shall have this writ. Formedon in *reverter*, lies where lands are entailed on certain persons and their issue, with remainder over for want of issue; and, on that remainder failing, then to revert to the donor and his heirs: in this case, if the tenant in tail dies without issue, and also he in remainder, the donor and his heirs, to whom the reversion returns, may have this writ for the recovery of the estate, though the same be alienated, &c.

FORMIÆ, or FORMIA, (anc. geog.), a maritime town of the Adjected or New Latium, to the south-east of Cajeta; built by the Lacedæmonians, (Strabo;) called originally *Hormiæ*, on account of its commodious harbour. An ancient municipium. *Formiani*, the people; who were admitted to the liberty of the city the very year in which Alexandria was built; but not to the right of suffrage till a long time after the second Punic war, (Livy). *Formiæ* at this day lies in ruins, near a place now called *Mola*.

FORMICA, or the ANT, in zoology; a genus of insects belonging to the order of hymenoptera, the characters of which are these: There is a small scale betwixt the breast and belly; and the joint is so deep, that the animal appears as if it were almost cut thro' the body. The females, and the neuters or working ants which have no sexual characteristics, are furnished with a hidden sting; and both the males and females have wings, but the neuters have none. There are 18 species, most of them distinguished by their colours. Formica. Plate CXCVI.

These insects keep together in companies like the bees, and maintain a sort of republic. Their nest is not exactly square, but longer one way than the other; and in it there are a sort of paths, which lead to different magazines. Some of the ants are employed in making the ground firm, by mixing it with a sort of glue, for fear it should crumble and fall down upon them. They may be sometimes seen to gather several twigs, which serve them for rafters, which they place over the paths, to support the covering; they lay others across them, and upon them rushes, weeds, and dried grass, which they heap up into a double declivity, which serves to turn off the water from their magazines. Some of these serve to lay up their provisions in, and in others they lay their eggs.

As for the provisions, they lay up every thing that is fit for them to eat; and you may often see one loaded with pippin or grain of fruit, another with a dead fly, and several together with the carcase of a may-bug or other insect. If they meet with any they cannot bring away, they eat it upon the spot, or at least so much of it as may reduce it to a bulk small enough for them to carry. They do not run about where they please, at all adventures: for some of them are sent abroad to make discoveries; and if they bring back news that they have met with a pear, or a sugar-loaf, or a pot of sweetmeats, they will run from the bottom of the garden, as high as the third story of a house, to come at it. They all follow each other in the same path, without wandering to the right or the left; but in the fields they are more at their liberty, and are allowed to run about in search of game. There is a sort of green fly *, that does a great deal of mischief among the flowers, and which curls up the leaves of peach and pear trees: and these are surrounded with a sort of glue, or honey, which the ants hunt after very greedily; for they touch neither the plant nor the flies themselves. Next to this, their greatest passion is to lay up hoards of wheat and other corn; and for fear the corn should sprout by the moisture of the subterraneous cells, they gnaw off the end which would produce the blade. The ants are often seen pushing along grains of wheat or barley much larger than themselves. It is remarkable, that if one ant meets another that is loaded, it always gives way to let it pass freely; or will help it if it be overburdened.

* The *Aphis*.

The ant lays eggs in the manner of the common flies; and from these eggs are hatched the larvæ, a sort of small maggots or worms without legs: these are sharp at one end and blunt at the other; and are white, but so transparent that the intestines are seen through the skin. These, after a short time, change into large white aureliæ or chrysalids, which are what are usually called *ants eggs*. That end which is to be the tail is the

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Plate CXCVI.

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Formica. the largeſt, and that which is the head is ſomewhat tranſparent. The ants move theſe about at pleaſure with their forceps. It is well known, that when a neſt of theſe creatures is diſturbed, and the aureliæ ſcattered about, the ants are at infinite paine to get together all that are unhurt, and make a neſt for them again: nay, any ants will do this, and thoſe of one neſt will often take care of the aureliæ of another. Formica.

The care theſe creatures take of their offſpring is remarkable. Whenever a hill is diſturbed, all the ants are found buſied in conſulting the ſafety, not of themſelves, but of the eggs or thoſe larger bodies incloſing the maggot or young ant; they carry theſe down any way ſo as to get them out of ſight, and will do this over and over as often as they are diſturbed. They carry away the eggs and vermicles together in their confuſion; but, as ſoon as the danger is over, they carefully ſeparate them, and place each ſort in parcels by themſelves under ſhelter of different kinds, and at various depths, according to the different degrees of warmth and coverture the different ſtates require. In the warm ſeaſon of the year, they every morning bring up the *eggs*, as they are uſually called, to the ſurface, or nearly ſo; and from ten in the forenoon to five in the afternoon or thereabouts, all theſe will be found juſt under the ſurface: and if the hills be examined toward eight in the evening, they will be found to have carried them all down; and if rainy weather be coming on, it will be neceſſary to dig a foot deep or more, in order to find them. All human precautions have not hitherto been able to ſupply that degree of warmth and minute attention which the ants put in practice to forward the inſtant of their laſt metamorphoſis. The inſect, iſſuing forth to a new life, tears its white tranſparent veil; it is then a real ant, deſtitute of wings, if it has no ſex; winged, if it be male or female, always to be known by a ſmall erect ſcale placed on the thread which connects the body and thorax. Ants tranſact their amours in the air. The males, who are much ſmaller, ſeldom frequent the common habitation: but the females much larger, repair to it to depoſit their eggs, which is all the labour they undergo; the winter's cold deſtroys them. As to the males, it is uncertain whether they fall victims to the ſeverity of winter, or are made over to the rage of the labouring ants. Theſe laſt paſs the winter in a torpid ſtate, as ſome other inſects do, till ſpring reſtores them to their wonted activity: they have therefore no ſtores for winter, no conſumption of proviſions. What are commonly ſold in markets for ant's eggs are grubs newly hatched, of which pheaſants, nightingales, and partridges, are very fond. The chief enemies to ants are the formica-leo, magpies, and ſome other birds and beaſts.

In the hotter countries, as Italy, Spain, and the Weſt Indies, ants are the greateſt peſt of the fields. Trees, which they are ſaid to injure greatly, may be preſerved from them by encompaſſing the ſtem, for four fingers breadth, with a roll of wool, newly pulled from the ſheep's belly; or by laying ſaw-duſt all round the ſtump of it. Some anoint the tree with tar, which has the ſame effect. But whatever harm they may do in paſture-lands, by making up hills for their habitation and impairing or drying up the graſs, their damaging fruit-trees appears to be an unjuſt reproach. On the contrary, in Switzerland they are made ſubſervient to the deſtruction of caterpillars. This is done by hanging a pouch filled with ants upon a tree; and they, making their eſcape through an aperture contrived on purpoſe, run over the tree without being able to reach down to the ground, becauſe care has been previouſly taken to beſmear the foot of the tree with wet clay or ſoft pitch; in conſequence of which, compelled by hunger, they fall upon the caterpillars and devour them. People pretend to ſay, that ants, taken inwardly, give a ſpring to the urinary ducts and to the organs of generation. The red colour which they communicate to blue paper, when cruſhed upon it, proves that they contain an acid (ſee CHEMISTRY, n° 2d 907.)

The large, black, winged ants of America, to avoid the great rains which fall there at particular ſeaſons, make to themſelves large neſts on trees, with a covered way for them to go up and down on the lee-ſide of the tree. Theſe neſts are roundiſh on the outſide, made of light brown earth, plaſtered ſmooth. They are larger than a buſhel; and in the inſide are many ſinuous caverns or lodgings communicating with one another. See Plate CXCVI. A, The ants neſt; B, The tubular paſſage, made of the ſame materials.

As to thoſe inſects called *white ants*, which abound in Africa and the Eaſt Indies, they belong to a different genus; for which ſee the article TERMES.

FORMICA-LEO, the *Ant-lion*, in zoology, an inſect ſo called from its devouring great numbers of ants. It is the caterpillar or worm of a fly much reſembling the libellæ or dragon-flies; and feeds chiefly upon ants, from which property it derives its name.

It is ſomewhat of the nature of the ſpider in its way of taking its prey, its manner of ſpinning, and the figure and ſoftneſs of its body. It has, in its general figure, ſomewhat of the appearance of the millepes or wood-louſe, ſo that ſome have miſtaken it at firſt ſight for that animal. It is of a dirty greyiſh colour, marked with ſome black ſpots; and theſe are alſo compoſed of many points when viewed with a microſcope, which make it reſemble a hedge-hog or porcupine. Its body is compoſed of ſeveral rings, and has thence a wrinkled look. It has ſix legs, four are joined to the breaſt, and the other two to a longer part, which may be taken for its neck. Its head is ſmall and flat, and it has two remarkable horns: theſe are about a ſixth part of an inch long, and as thick as a hair: they are hard, hollow, and hooked at the end like the claws of a cat. At the origin of each of theſe horns, it has a clear and bright black eye, which ſees very diſtinctly, and gives the creature notice to eſcape on ſight of the ſmalleſt object.—This creature is not able to hunt after its prey, nor to deſtroy large inſects; it can only draw into its ſnares ſuch as come near its habitation, and of theſe very few are ſuch as he can manage: all the winged kind are able to eſcape by flight; and the beetle kinds, and others that have hard ſhells upon their bodies, are of no uſe to him, as his horns cannot pierce them. The ſmallneſs of the ant, and the want of wings in the neuters, make them the deſtined prey of this devourer. The manner in which he catches his prey is as follows.

He uſually encamps under an old wall, that he may be ſheltered from the injuries of the weather; and he always chooſes a place where the ſoil is compoſed of a fine dry ſand In this he makes a pit of the ſhape of

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Formica. a funnel, or an inverted hollow cone. If he intends the pit to be but ſmall, he thruſts down his hinder part into the ſand, and by degrees plunges himſelf backward into it; and when he has got to a certain depth, he toſſes out the looſe ſand which has run down with his head, artfully throwing it off beyond the edges of his pit. Thus he lies at the bottom of a ſmall hollow, which is wideſt at the top, and comes ſloping down to his body.

But if he is to make a larger pit, more pains are required to bring it to perfection. He firſt traces, in the ſurface of the ſand, a large circle, which is the erected baſe or mouth of the pit he is to make in form of an inverted cone. He then buries himſelf in the ſand near the edge of this circle, and carefully throws up the ſand above him, with his head toſſing it out beyond the circumference of the circle. Thus he continues his work, running down backwards in a ſpiral line all the way, and carefully throwing off the ſand from above him, till he is come to the place of his reſt, which is the point or reverted apex of the hollow cone he has formed by his paſſage. The length of his neck, and the flatneſs of his head, gives him a power of uſing the whole as a ſpade, and throwing off the ſand with great eaſe; and his ſtrength in this part is ſo great, that he is able to throw off a quantity of it to ſix inches diſtance. This is a power he exerts oftener, however, in throwing away the remains of the animals he has fed upon, that his den may not become frightful to others of the ſame ſpecies, by ſeeing their fellow carcaſes about it.

When he has finiſhed his pit, he buries himſelf at the bottom of it among the ſand, leaving no part above ground but the tips of his two horns, which he expands to the two ſides of the pit. In this condition he lies and waits for his prey, and never comes up afterwards. When an ant, or any other ſuch creature, chances to walk over the edges of his pit, its ſteps throw down a little of the ſand, which naturally running down to the bottom of the pit, gives the enemy notice of his prey; he then toſſes up the ſand which covers his head, to bury the ant, and bring him down with its returning force to the bottom; and as one ſuch attempt cannot be ſufficient to prevent the ant's eſcape, he throws more and more ſand upon him, till he by degrees brings him down. All the endeavours of the ant to eſcape, when once it is within the verge of the pit, are in vain; for, as it attempts to climb, the ſand runs away from under its feet, and it ſinks the lower for every attempt. This motion of the ſand alſo informs the enemy where it is, and directs him to throw up more ſand in the right place; which it does, till the poor ant falls to the bottom between its horns. It then plunges the points deep into the ant's body; and having ſucked all the juice out of the prey, it throws out the empty ſkin as far from the hole as it can. This done, it mounts up the edges of its pit, and if it has ſuffered any injury, repairs it with great care, and immediately buries itſelf again in the centre, to wait for another meal. The horns of this creature are its only organs for receiving nouriſhment; it never brings any animal which it has ſeized near to its head, but always holds it at the tip of the horns. They therefore plainly ſerve as ſyringes, to draw into its ſtomach the juices of the bodies of the inſects it feeds upon: neither is there any mouth or trunk, or any other organ to be diſcovered about its head, which could ſerve to the purpoſe of eating; the head ſeeming only intended for throwing away the ſand in forming the pit. The horns of this animal being ſo neceſſary to its life, nature has provided for the reſtoring them in caſe of accidents; and, if cut off, they are found to grow again. Formica.

The food this creature procures by its pit can be but little; and as it has no power of catching its prey any other way, its motion being only backwards, and that ſlowly, and by ſmall ſpaces at a time, ſome people have believed its catching now and then an ant by this means was rather for diverſion than hunger. But tho' the formica-leo will live a long time without food, and even paſs through all its changes when ſhut up in a box, yet it is always ready to eat when food is offered it; it always appears ſtarved and ſmall when kept thus; and if a fly is given it in this hungry ſtate, it will ſo ſuck out all its juices, that the ſhell remaining may be rubbed to powder between the fingers, while the body of the creature that has ſucked it appears remarkably ſwelled and diſtended; ſo that it is plain that the juices of the prey are conveyed into the body of the creature; though it is not eaſy to ſee by what means, the horns not appearing to have any perforation.

When the formica-leo has lived a proper time in this ſtate, it leaves its pit, and is only ſeen drawing lines and traces on the ſurface of the ſand. After this it buries itſelf under the ſurface; and there incloſes itſelf in a fine web, in which it is to paſs its tranſformation into the winged ſtate. This caſe is made of a ſort of ſilk which the creature ſpins in the manner of the ſpider, and of a quantity of the grains of ſand cemented together by a glutinous humour which flows from its pores. This caſe, however, would be too harſh and coarſe for the body of the creature, and therefore it ſerves only for the outer covering to defend it from injuries; the creature ſpinning one of pure and incomparably fine ſilk, of a beautiful pearl colour, within it, which covers its whole body.

When the creature has lain ſome time in this caſe, it throws off its outer ſkin, with the eyes, the horns, and every other part neceſſary to its life before, and becomes an oblong nymph, in which a careful eye may trace the form of the fly into which it is to be tranſformed. There may be ſeen, through its tranſparent covering, new eyes, new horns, wings, and all the other parts of the animal in its perfect ſtate. This nymph makes its way about half out of the ſhell, and remains in this condition, but without farther life or motion, till the perfect fly makes its way out at a ſlit in the back. In this laſt ſtate it much reſembles the libellæ or dragon-flies common about our waters. The male couples with the female in this ſtate only; and M. Poupart, to whom the world is obliged for this curious deſcription, is of opinion that the females lay only one egg; but this is very different from the courſe of nature in the other animals of the ſame claſs.

When this inſect forms its pit in a bed of pure ſand, it is made and repaired with great eaſe; but where it meets with other ſubſtances among the ſand, the labour becomes greatly the more embarraſſing. If, for inſtance, when the creature has half formed its pit, and then comes to a ſtone of ſome moderate ſize, it does not deſert the work for this, but goes on, intending to

remove

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Forming. Formosa.

remove that impediment at last. When the pit is finished, the creature crawls backward up the side of the place where the stone is, and getting its backside under it, takes great pains and time to get it on a true poise, and then begins to crawl backward with it up the edge to the top of the pit, to get it out of the way. It is a very common thing to see a formica-leo in this manner labouring at a stone four times as big as its own body; and as it can only move backward, and the poise is hard to keep, especially up a slope of such crumbly matter as sand, which moulders away from under its feet, and necessarily alters the position of its body, the stone very frequently falls down when near the verge, and then it is sure to roll to the bottom. In this case the animal attacks it again in the same way, and often is not discouraged by five or six miscarriages of this kind; but, after all, attempts again, and at length gets it over the verge of the place. When it has done this, it does not leave it there, lest it should roll in again; but is always at the pains of pushing it farther on, till it has removed it to a necessary distance from the edge of the pit.

The common formica-leo moves only backward; but Mr Rouet has observed a species which moves forward in the common way of other animals, and makes no pit of this kind to entrap its prey, but seizes other insects by force.

FORMING is used for the act of giving being or birth to any thing.

The word is also simply used for giving the figure to any thing. The potter forms his vessels as he pleases. Geometry teaches how to form all kinds of figures.

It is likewise used for the producing of a thing: thus, the lineaments of the face began to be formed.

Forming of a Siege, is the making lines of circumvallation to fortify the camp, and disposing things for the attack of a place in form.

They also say, to form a squadron or battalion; meaning, to range the soldiers in form of a squadron, &c.

Forming the Line, is drawing up infantry, cavalry, and artillery, into line of battle. See Line.

Forming is also used in grammar, in speaking of certain tenses of verbs, which are made from others by a change of certain letters. The present tense is formed from the infinitive. Compound and derivative words also, and even all that have any etymology, are said to be formed.

FORMOSA, an island in the Pacific Ocean, between 119° and 122° of E. Long. and 22° and 25° N. Lat. about 100 miles east of Canton in China. It is subject to the Chinese; who, however, notwithstanding its vicinity, did not know of its existence until the year 1430. It is about 85 leagues in length, and 25 in breadth. A long chain of mountains, which runs from north to south, divides it into two parts, the eastern and western. The Dutch formed an establishment in the western part in 1634, and built the fort of Zealand, which secured to them the principal port of the island; but they were driven from thence in 1659 or 1661 by a celebrated Chinese pirate, who made himself master of all the western part, which afterwards submitted in 1682 to the authority of Kang-he emperor of China.

This western part of Formosa is divided into three distinct governments, all subordinate to the governor of Tai-ouan, the capital of the island, who is himself subject to the viceroy of the province of Fokien.

This island presents extensive and fertile plains, watered by a great number of rivulets that fall from the eastern mountains. Its air is pure and wholesome; and the earth produces in abundance corn, rice, and the greater part of other grains. Most of the Indian fruits are found here, such as oranges, bananas, pine-apples, guavas, papaws, cocoa-nuts; and part of those of Europe, particularly peaches, apricots, figs, raisins, chesnuts, pomegranates, water-melons, &c. Tobacco, sugar, pepper, camphire, and cinnamon, are also common. Horses, sheep, and goats, are very rare in this island: there are even few hogs, although these animals abound in China. Domestic poultry, such as fowls, geese, and ducks, are exceedingly plenty; pheasants also are sometimes seen; and monkeys and stags have multiplied so much, that they wander through the country in large flocks.

The inhabitants of Formosa rear a great number of oxen, which they use for riding, from a want of horses and mules. They accustom them early to this kind of service, and by daily exercise train them to go as well and as expeditiously as the best horses. These oxen are furnished with a bridle, saddle, and crupper. A Chinese looks as big and proud when mounted in this manner, as if he were carried by the finest Barbary courser.

Wholesome water fit for drinking is the only thing wanting in the island of Formosa. It is very extraordinary, that every kind of water in it is a deadly poison to strangers, for which no remedy has hitherto been found. "One of the governor's servants," says Father de Mailla, "whom I had in my train (a strong and robust man), trusting too much to the force of his constitution, would not believe what had been told him concerning this water: he drank some of it; and died in less than five days, after every medicine and antidote had been administered without success. There is none but the water of the capital which can be drunk: the mandarins of the place therefore always took care to transport a sufficiency of it in carts for our use." Our author adds, that at the bottom of a mountain a league distant from Fong-kan-hien, there is a spring that produces a stream, the water of which is of a whitish blue colour, and so noxious, that no one can approach it.

There are few mulberry-trees in Formosa, consequently little silk is made in the country. Numerous manufactures, however, would soon be introduced into it, were the Chinese permitted indiscriminately to transport themselves thither, and to form establishments in the island. Those who go to it must be protected by passports from the Chinese mandarins, and these passports are sold at a dear rate; securities are besides required. This is not all: when they arrive, money must be given to the mandarins who are appointed to examine those who enter or quit the island, and who generally discharge this duty with the most rigid severity. If they give no present, or offer only a trifle, they meet with little mercy; and are sure to be sent back, whatever passport they may have. The Chinese, though policy, connive at these exactions, to prevent too,

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Formoſa. too great a number of people from emigrating to this iſland, which is rendered a place of great importance by its proximity to China. They fear, and with great reaſon (eſpecially ſince Tartar emperors have been on the throne), that if any revolt ſhould happen in Formoſa, its influence might ſpread, and occaſion great diſturbance in the whole empire. On this account, the Tartars keep a garriſon there of 10,000 men; which they take care to change every three years, or even oftener if they judge it neceſſary.

Beſides the capital, the Chineſe have alſo two other cities, and ſome villages, where they inhabit alone; for they do not permit the Indians, who are their ſubjects, to live among them; they ſuffer none to remain but thoſe who are either their ſlaves or domeſtics. Theſe Indians are united into 45 villages; 36 of which lie to the north, and 9 towards the ſouth. The northern villages are very populous, and the houſes are built almoſt after the Chineſe manner. The habitations of the ſouthern iſlanders are only heaps of huts or cottages of earth. In theſe huts they have neither chairs, benches, tables, beds, nor any piece of furniture; the middle part is occupied by a kind of hearth or chimney, raiſed two feet high, and conſtructed of earth, upon which they dreſs their victuals. Their ordinary food is rice, other ſmall grain, and the game which they catch by courſing or kill with their arms. Theſe iſlanders run with ſuch ſurpriſing ſwiftneſs, that they can almoſt outſtrip the fleeteſt greyhound. The Chineſe attribute this agility to the precaution they take of confining their knees and reins by a cloſe bandage until the age of 14 or 15. Their favourite arms are lances, which they dart to the diſtance of 60 or 80 feet with the greateſt dexterity and preciſion. They uſe bows and arrows, and can kill a pheaſant on wing with as much certainty as an European ſportſman could with a fuſee. Theſe people are very dirty in their manner of eating. They have neither plates, diſhes, nor ſpoons, nor even the ſmall ſticks uſed in China. Whatever they dreſs is placed on a plain board or mat, and they make uſe of their fingers for conveying it to their mouths. They eat fleſh half raw; and provided it has been only preſented to the fire, it appears to them excellent. Their beds are formed of freſh-gathered leaves. They go almoſt naked, and wear only a piece of cloth which hangs from their girdle to their knees. Thoſe among them who, according to the judgment of the chiefs of the village, have borne away the prize for agility in running or dexterity in the chaſe, obtain the honourable privilege of making on their ſkin, by a very painful operation, ſeveral fantaſtical figures of flowers, trees, and animals. All have the right of blackening their teeth, and of wearing ornaments of bracelets and crowns made of ſhells and cryſtal.

The iſlanders who inhabit the northern part, where the climate is ſomething colder, clothe themſelves with the ſkins of the ſtags which they kill in hunting. They make a kind of dreſs of them without ſleeves, that pretty much reſembles a dalmatic, or veſtment worn at the altar by the Roman clergy. They wear on their heads caps in the form of a cylinder, made of palm-leaves, and ornamented with ſeveral crowns placed one above another, on the top of which they fix plumes compoſed of the feathers of a cock or pheaſant

The marriage ceremonies of the inhabitants of Formoſa approach near to the ſimple laws of nature. They neither purchaſe, as in China, the women whom they eſpouſe, nor does intereſt ever preſide over their unions. Fathers and mothers are ſcarcely ever conſulted. If a young man has a mind to marry, and has fixed his affection on a young girl, he appears for ſeveral days following near the place where ſhe lives with a muſical inſtrument in his hand. If the young woman is ſatisfied with the figure of her gallant, ſhe comes forth and joins him: they then agree, and ſettle the marriage-contract. After this they give notice to their parents, who prepare a wedding-dinner, which is always given in the houſe where the young woman reſides, and where the bridegroom remains without returning again to his father. The young man afterwards conſiders the houſe of his father-in-law as his own. He becomes the whole ſupport of it, and he has no farther connection with that of his father; like married women in Europe, who generally quit their paternal home in order to live with their huſbands. Theſe iſlanders therefore ſeldom offer up vows for obtaining male children: they prefer daughters, becauſe they procure them ſons-in-law, who become the ſupports of their old age. Formoſa.

Although the Formoſans are entirely ſubjected to the Chineſe, they ſtill preſerve ſome remains of their ancient government. Each village chooſes three or four old men from among thoſe who have the greateſt reputation for probity. By this choice they become the rulers and judges of the reſt of the hamlet. They have the power of finally determining all differences; and if any one ſhould refuſe to abide by their judgement, he would be immediately baniſhed from the village, without hopes of ever being able to re-enter it, and none of the inhabitants would afterwards dare to receive him.

The natives pay in grain the tribute impoſed on them by the Chineſe. To regulate every thing that concerns the laying on and collecting of this impoſt, government have eſtabliſhed a Chineſe in every village, who is obliged to learn the language, and act as interpreter to the mandarins. Theſe interpreters are moſt cruel extortioners to the miſerable people, whom they ought rather to protect: they are ſuch inſatiable leeches, that they can ſcarcely ever be ſatisfied. This daily and domeſtic tyranny has already cauſed the defection of three villages in the ſouthern part of the iſland, where formerly there were twelve. The inhabitants of theſe villages revolted, expelled their interpreters, refuſed to pay tribute any longer to the Chineſe, and have united themſelves to the independent nation in the eaſtern part of the iſland.

It was in the iſland of Formoſa that John Struys affirms to have ſeen with his own eyes a man who had a tail more than a foot in length, covered with red hair, and greatly reſembling that of an ox. This man with a tail ſaid, that his deformity, if it was one, proceeded from the climate, and that all thoſe of the ſouthern part of the iſland were born with tails like his.—But John Struys is the only author who atteſts the exiſtence of this extraordinary race of men; no other writer who has ſpoken of Formoſa makes the leaſt mention of them. Another circumſtance, no leſs ſingular, and which appears to be little better authen-

ticated,

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Formosa. tiated, is, that in this island women are not permitted to bring forth children before they are 35, although they are at liberty to marry long before that age. Rechteren * thus expresses himself concerning this strange custom:

* *Dutch East India Company Voyages*, vol. v. p. 96.

"When women are first married, they bring no children into the world; they must, before that is permitted, have attained the age of 35 or 37. When they are big with child, their priestesses pay them a visit, and tread on their bellies with their feet, if it be necessary, and make them miscarry, with perhaps greater pains than they would have in being brought to bed. It would be not only a shame, but an enormous crime, to bring forth a child before the term prescribed. I have seen some females who had already destroyed the fruit of their womb 15 or 16 times, and who were big for the 17th when it was lawful for them to bring forth a living child."

To our description of Formosa we shall add the following account of the dreadful disaster that lately befel this unhappy island. The details were conveyed by a letter from Peking, addressed to M. Bertin, and dated the 14th of July 1782.

'The waters of the ocean have well nigh deprived China of one of its most valuable maritime possessions. The island of Tay-ouan, known in Europe by the name of Formosa, has been almost swallowed up by them. It has been reported here, that part of the mountain which divides the island has sunk and disappeared; that the rest has been overturned; and that the greater part of the inhabitants have perished. Such have been for some days the popular reports in this capital. Government, however, has put a stop to them, by informing the public of the real truth; such as it is has been announced to the emperor by the officers who have this small portion of his territories under their jurisdiction. I cannot do better than transcribe what they have written. The dispatches of the Chinese officers, addressed to the emperor, run thus:

"Bechen, governor-general of the provinces of Fokien and Tche-Kyang-ya, viceroy of Fokien, and others, make known to your majesty the disaster that has lately befallen the island of Tay-ouan. Monha-hon, and other principal officers of this island, have acquainted us, that on the 21st of the fourth moon (May 22d, 1782), a most furious wind, accompanied with heavy rain and a swell of the sea greater than ever remembered, had kept them under continual apprehension of being swallowed up by the waves, or buried in the bowels of the earth, from the hour of *yn* until the hour *ouei* (A). This dreadful tempest seemed to blow at the same time from the four cardinal points of the compass, and continued with equal violence during the above mentioned time. The buildings where the tribunals were held, the public granaries, the barracks, salt warehouses, and works, have been totally destroyed, and every thing they contained is lost: warehouses and work-shops, as well as private houses, for the most part, present nothing but ruins and heaps of rubbish. Of 27 ships of war which were in the harbour 12 have disappeared; two others have been dashed to pieces, and 10 are shattered in such a manner that they are rendered entirely unfit for service; other smaller vessels of different sizes, above 100 in number, have shared the same fate; eighty have been swallowed up; five others, which had just taken in a lading of rice for Fokien, have sunk, and their cargoes, which amounted to 100,000 bushels, are wholly lost. With regard to other vessels, whether small or great, which had not entered the harbour, 10 or 12 of the largest are reckoned to have been swallowed up; those of inferior size, as well as a prodigious number of barks, boats, and other small vessels of different kinds, have disappeared, without leaving the least piece of wreck behind them. As the whole island has been covered with water, the provisions have been either swept away or spoilt, so as to render them prejudicial to the health of those who use them in their present state. The crops are entirely lost. When we shall have been informed of particulars, we shall not fail to give your majesty the earliest intelligence of them.—After having received this letter from Mon-ha-hon, and the other principal officers residing at Tay-ouan, I employed the utmost diligence to give every assistance in my power to this unfortunate island; and I ordered the travelling commissary, and Trey-ouen, general of the province, to get particular information of the number of those who have perished, of the houses destroyed, and of the quantity of salt and other provisions that has been lost: I have likewise enjoined them to rebuild with the utmost expedition the tribunals, granaries, and other public edifices; to dispatch proper persons to search for the vessels and ships that have disappeared; to repair those which are not altogether unfit for service, and to send immediately to the neighbouring countries for salt and other necessary provisions; but above all, to ascertain in the most accurate manner the different losses sustained by the inhabitants, and the precise number of people that have perished, in order that I may be able to give the fullest information to your majesty."

Formosa.

'The emperor of China caused a particular detail of these losses to be published, together with the following letter:

"Tchang-yu, &c. Tchem-hoei-Thon-Tsong-tou of Fokien, and others, have informed me of the dismal event that hath taken place in the island of Tay-ouan, which is a district of the province of Fokien. They have written to me, that on the 21st of the fourth moon. [Here the emperor repeats what is contained in the preceding letter, and continues thus]: I command Tsong-tou to get the best information he can of the different losses sustained by the inhabitants of the island, and to transmit the particulars to me, in order that I may give them every assistance to repair them. My intention is, that all the houses which have been thrown down shall be rebuilt entirely at my expence; that those be repaired which are only damaged; and that provisions, and every thing which the people stand in immediate want of, be supplied them. I should feel much pain, were even one among them to be neglected: I therefore recommend the utmost diligence

(A) The hours of the Chinese are double ours: the hour *yn* begins at three in the morning and ends at five; *ouei* begins at three in the afternoon and ends at five.

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Formula ‖ Fornication.

ligence and ſtricteſt inquiry, as I am deſirous that none of my ſubjects ſhould entertain the leaſt doubt of the tender affection which I have for them; and that they ſhould know that they are all under my eyes, and that I myſelf will provide for their wants. With regard to my ſhips of war, tribunals, and public edifices, let them be reſtored to their former ſtate with money taken from the public treaſury, and let the general account of the whole expence be laid before me."

The miſſionary who ſent this account farther ſays, From theſe letters it evidently appears, that this diſaſter happened in conſequence of an earthquake; but he adds, that the volcano which occaſioned it muſt be at a prodigious depth below the ſea. He does not pretend to give an explanation of it; he is contented with obſerving, that the ſame ſcene ſeems to have paſſed at the iſland of Formoſa as at Lima and Liſbon.

FORMULA, or FORMULARY, a rule or model, or certain terms preſcribed or decreed by authority, for the form and manner of an act, inſtrument, proceeding, or the like.

FORMULA, in church-hiſtory and theology, ſignifies a profeſſion of faith.

FORMULA, in medicine, imports the conſtitution of medicines, either ſimple or compound, both with reſpect to their preſcription and conſiſtence.

FORMULARY, a writing, containing the form or formula of an oath, declaration, atteſtation, or abjuration, &c. to be made on certain occaſions.

There are alſo formularies of devotion, of prayers, &c. Liturgies are formularies of the public ſervice in moſt churches.

FORNACALIA, or FORNICALIA, in Roman antiquity, a feſtival inſtituted by Numa, in honour of Fornax, the goddeſs of ovens; wherein certain cakes were made, and offered in ſacrifice before the ovens.

FORNICATION (*Fornicatio*, from the *fornices* in Rome, where the lewd women proſtituted themſelves for money), is whoredom, or the act of incontinency, between ſingle perſons; for if either of the parties is married, it is *adultery*. Formerly court-leets had power to inquire of and puniſh fornication and adultery; in which courts the king had a fine aſſeſſed on the offenders, as appears by the book of Domeſday.

In the year 1650, when the ruling powers found it for their intereſt to put on the ſemblance of a very extraordinary ſtrictneſs and purity of morals, not only inceſt and wilful adultery were made capital crimes, but alſo the repeated act of keeping a brothel, or committing fornication, were (upon a ſecond conviction) made felony without benefit of clergy. But, at the reſtoration, when men, from an abhorrence of the hypocriſy of the late times, fell into a contrary extreme of licentiouſneſs, it was not thought proper to renew a law of ſuch unfaſhionable rigour. And theſe offences have been ever ſince left to the feeble coerſion of the ſpiritual court, according to the rules of the canon law; a law which has treated the offence of incontinence, nay, even adultery itſelf, with a great degree of tenderneſs and lenity; owing perhaps to the conſtrained celibacy of its firſt compilers. The temporal courts therefore take no cogniſance even of the crime of adultery otherwiſe than as a private injury. See ADULTERY.

The evils of fornication, which too many wiſh to conſider as no ſin, may be judged of from the following particulars. Fornication.

1. The malignity and moral quality of each crime is not to be eſtimated by the particular effect of one offence, or of one perſon's offending, but by the general tendency and conſequence of crimes of the ſame nature. In the preſent caſe, let the libertine conſider and ſay, what would be the conſequence, if the ſame licentiouſneſs in which he indulges were univerſal? or what ſhould hinder its becoming univerſal, if it be innocent or allowable in him?

2. Fornication ſuppoſes proſtitution; and by proſtitution the victims of it are brought to almoſt certain miſery. It is no ſmall quantity of miſery in the aggregate, which, between want, diſeaſe, and inſult, is ſuffered by thoſe outcaſts of human ſociety who infeſt populous cities; the whole of which is a general conſequence of fornication, and to the increaſe and continuance of which every act and inſtance of fornication contributes.

3. Fornication produces habits of ungovernable lewdneſs, which introduce the more aggravated crimes of ſeduction, adultery, violation, &c. The criminal indulgences between the ſexes prepare an eaſy admiſſion for every ſin that ſeeks it: they are, in low life, uſually the firſt ſtage in mens progreſs to the moſt deſperate villanies; and in high life, to that lamented diſſoluteneſs of principle, which manifeſts itſelf in a profligacy of public conduct, and a contempt of the obligations of religion and moral probity.

4. Fornication perpetuates a diſeaſe, which may be accounted one of the foreſt maladies of human nature, and the effects of which are ſaid to viſit the conſtitution of even diſtant generations.

The paſſion being natural, proves that it was intended to be gratified; but under what reſtrictions, or whether without any, muſt be collected from different conſiderations.

In the Scriptures, fornication is abſolutely and peremptorily condemned. 'Out of the heart proceed evil thoughts, murders, adulteries, fornication, theſts, falſe witneſs, blaſphemies; theſe are the things which defile a man.' Theſe are Chriſt's own words; and one word from him upon the ſubject is final. The apoſtles are more full upon this topic. One well-known paſſage in the Epiſtle to the Hebrews may ſtand in the place of all others; becauſe, admitting the authority by which the apoſtles of Chriſt ſpake and wrote, it is deciſive. 'Marriage and the bed undefiled is honourable amongſt all men, but whoremongers and adulterers God will judge;' which was a great deal to ſay, at a time when it was not agreed even amongſt philoſophers that fornication was a crime.

Upon this ſubject Mr Paley adds the following obſervations*:

"The Scriptures give no ſanction to thoſe auſterities which have been ſince impoſed upon the world under the name of Chriſt's religion, as the celibacy of the clergy, the praiſe of perpetual virginity, the *prohibitio concubitus cum gravida uxore*; but with a juſt knowledge of, and regard to the condition and intereſt of the human ſpecies, have provided in the marriage of one man with one woman an adequate gratification for the propenſities of their nature, and have reſtrained them to that gratification.

* Moral and Political Philoſophy, p. 341.

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Fornication || Forres

"The avowed toleration, and in some countries the licensing, taxing, and regulating of public brothels, has appeared to the people an authorizing of fornication, and has contributed, with other causes, so far to vitiate the public opinion, that there is no practice of which the immorality is so little thought of or acknowledged, although there are few in which it can more plainly be made out. The legislators who have patronized receptacles of prostitution ought to have foreseen this effect, as well as considered, that whatever facilitates fornication, diminishes marriages. And as to the usual apology for this relaxed discipline, the danger of greater enormities if access to prostitutes were too strictly watched and prohibited; it will be time enough to look to that, after the laws and the magistrates have done their utmost. The greatest vigilance of both will do no more, than oppose some bounds and some difficulties to this intercourse. And after all, these pretended fears are without foundation in experience. The men are in all respects the most virtuous in countries where the women are most chaste.

"If fornication be criminal, all those incentives which lead to it are accessaries to the crime; as lascivious conversation, whether expressed in obscene or disguised under modest phrases; also wanton songs, pictures, books; the writing, publishing, and circulating of which, whether out of frolic or for some pitiful profit, is productive of so extensive a mischief from so mean a temptation, that few crimes within the reach of private wickedness have more to answer for, or less to plead in their excuse.

"Indecent conversation, and by parity of reason all the rest, are forbidden by St Paul, Eph. iv. 29. 'Let no corrupt communication proceed out of your mouth;' and again, Col. iii. 8. 'Put filthy communication out of your mouth.'

"The invitation or voluntary admission of impure thoughts, or the suffering them to get possession of the imagination, falls within the same description, and is condemned by Christ, Matt. v. 28. 'Whosoever looketh on a woman to lust after her, hath committed adultery with her already in his heart.' Christ, by thus enjoining a regulation of the thought, strikes at the root of the evil."

FORNIX, in anatomy, is part of the corpus callosum in the brain; so called, because of a distant resemblance it hath to the arches of ancient vaults when viewed in a particular manner.

FORRAGE, in the military art, denotes hay, oats, barley, wheat, grass, clover, &c. brought into the camp by the troopers, for the sustenance of their horses.

It is the business of the quarter-master general to appoint the method of forrage, and post proper guards for the security of the foragers.

FORRES, a parliament town of Scotland in the county of Murray, classing with Inverness, Fortrose, and Nairn. It is a small well-built town, pleasantly situated on an eminence near the river Findhorn. The country about it has a cheerful appearance, having a few gentlemens seats, with some plantations about them. On a hill west of the town are the remains of a castle; and a melancholy view of a number of sand-hills, that now cover that tract of land which was formerly the estate of a Mr Cowben in the parish of Dyke. This inundation was occasioned by the influx of the sea and the violence of the wind. It had been the custom to pull up the bent, a long spiry grass near the shore, for litter for horses, by which means the sand was loosened, and gave way to the violence of the sea and wind, which carried it over several thousand acres of land. The people having been prevented from pulling up any more of the grass, the progress of the sand is now nearly stopped, and the sea has retired; but the wind has blown some of the sand from the hills over Colonel Grant's land, and destroyed near 100 acres. A sand-bank, which is all dry at low-water, runs out from this place for several miles into the Murray-Firth. Some of the land, which has been long forsaken by the water, is now beginning to be useful again, and is turned into grazing land. At Forres, coarse linen and sewing thread are made. About a mile from the town, on the left-hand side of the road, is a remarkable obelisk, said to be the most stately monument of the Gothic kind to be seen in Europe. It has been the subject of many able pens; but totally overlooked by Dr Johnson, who says, "At Forres we found good accommodation, but nothing worthy of particular remark."—It is thus described by Mr Cordiner, in a letter to Mr Pennant: "In the first division, underneath the Gothic ornaments at the top, are nine horses with their riders, marching forth in order: in the next is a line of warriors on foot, brandishing their weapons, and appear to be shouting for the battle. The import of the attitudes in the third division is very dubious, their expression indefinite. The figures which form a square in the middle of the column are pretty complex but distinct; four serjeants with their halberts guard a company, under which are placed several human heads, which have belonged to the dead bodies piled up at the left of the division: one appears in the character of executioner severing the head from another body; behind him are three trumpeters sounding their trumpets, and before him two pair of combatants fighting with sword and target. A troop of horse next appears, put to flight by infantry, whose first line have bows and arrows; the three following, swords and targets. In the lowermost division now visible, the horses seem to be seized by the victorious party, their riders beheaded, and the head of their chief hung in chains or placed in a frame; the others being thrown together beside the dead bodies under an arched cover. The greatest part of the other side of the obelisk, occupied by a sumptuous cross, is covered over with an uniform figure, elaborately raised, and interwoven with great mathematical exactness. Under the cross are two august personages, with some attendants, much obliterated, but evidently in an attitude of reconciliation; and if the monument was erected in memory of the peace concluded between Malcolm and Canute, upon the final retreat of the Danes, these large figures may represent the reconciled monarchs. On the edge below the fretwork are some rows of figures joined hand-in-hand, which may also imply the new degree of confidence and security which took place, after the feuds were composed, which are characterized on the front of the pillar. But to whatever particular transaction it may allude, it can hardly be imagined, that in so early an age of the arts in Scotland as it must have been raised, so elaborate a performance would have been undertaken but in consequence of an event

Forres.

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of the moſt general importance; it is therefore ſurpriſing, that no diſtincter traditions of it arrived at the era when letters were known. The height of this monument (called *King Sueno's ſtone*) above the ground is 23 feet; beſides 12 or 15 feet under ground. Its breadth is 3 feet 10 inches by 1 foot 3 inches in thickneſs."

FORSKOHLEA, in botany: A genus of the pentagynia order, belonging to the decandria claſs of plants. The calyx is pentaphyllous, and longer than the corolla. There are ten petals ſpatulated, *i. e.* roundiſh before, with a linear baſe.

FORSTERA, in botany: A genus of the triandria order, belonging to the gynandria claſs of plants. The perianthium is double; the exterior one beneath three-leaved; the interior one above, and ſix-cleft; the corolla tubular.

FORT, in the military art, a ſmall fortified place, environed on all ſides with a moat, rampart, and parapet. Its uſe is to ſecure ſome high ground, or the paſſage of a river, to make good an advantageous poſt, to defend the lines and quarters of a ſiege, &c.

Forts are made of different figures and extents, according as the ground requires. Some are fortified with baſtions, others with demi-baſtions. Some again are in form of a ſquare, others of a pentagon. A fort differs from a citadel, as this laſt is built to command ſome town.

Vitrified Forts, a very ſingular kind of ſtructures found in the highlands and northern parts of Scotland, in which the walls have the appearance of being melted into a ſolid maſs, ſo as to reſemble the lava of a volcano, for which indeed they have been taken by ſeveral perſons who have viſited them.

Theſe walls were taken notice of by Mr Williams an engineer, who wrote a treatiſe upon the ſubject, and was the firſt who ſuppoſed them to be the works of art; other naturaliſts having attributed them to a volcanic origin. Theſe works are commonly ſituated on the tops of ſmall hills, commanding an extenſive view of the adjacent valley or low country. The area on the ſummit, varying, as is ſuppoſed, according to the number of cattle the proprietor had to protect, or the dependents he was obliged to accommodate, is ſurrounded with an high and ſtrong wall, of which the ſtones are melted, moſt of them entirely; while others, in which the fuſion has not been ſo complete, are ſunk in the vitrified matter in ſuch a manner as to be quite incloſed with it; and in ſome places the fuſion has been ſo perfect, that the ruins appear like maſſes of coarſe glaſs. Mr Williams has not only abſolutely determined the walls in queſtion to be the works of art, but has even hazarded a conjecture as to the manner in which they were conſtructed, and which, according to him, was as follows. Two parallel dikes of earth or ſod being raiſed, in the direction of the intended wall, with a ſpace between them ſufficient for its thickneſs, the fuel was put in, and ſet on fire. The ſtones beſt adapted for the purpoſe, called the *plum-pudding ſtone*, are every where to be found in the neighbourhood. Theſe were laid on the fuel, and when melted, were kept by the frame of earth from running off; and by repeating the operation, the wall was raiſed to a ſufficient height. This opinion of the ſtones being thrown in without any order, is thought to be confirmed by the circumſtance of there not being any where a large one to be ſeen, nor a ſtone laid in any particular direction, nor one piece which has not in ſome degree been affected by the fire. Mr Williams mentions a fact tending to confirm his hypotheſis, viz. of a brick kiln ſituated on the declivity of an eminence, ſo as to be expoſed to the wind, which happening to riſe briſkly one time when the kiln was burning, ſo increaſed the heat, that the bricks were melted, and ran, like a lava, for a conſiderable way down the hill. Vitrified Forts.

The opinion of Mr Williams has been embraced by ſeveral other authors; particularly Mr Freebairn and Dr Anderſon, the latter having publiſhed two treatiſes upon theſe buildings in the Archæologia. In the ſame work, however, we meet with a paper by the Hon. Daines Barrington, in which the author expreſſes quite different ſentiments. He obſerves, that Mr Williams, and the other antiquaries, who ſuppoſe the walls in queſtion to be the works of art, imagine that the reaſon of their being conſtructed in this manner was the ignorance of cement, which in theſe remote ages prevailed in Scotland: but with reſpect to this circumſtance, he ſays, that if one ſide of the wall only was heated, and that to any conſiderable height, the matter in fuſion would in all likelihood drop down to the bottom, without operating as any cement to the looſe ſtones thrown in amongſt it. This circumſtance of the walls being vitrified only on one ſide, is indeed remarkable, and takes place in moſt of the forts of this kind to be met with at preſent: but with regard to it, Mr Barrington obſerves, that he himſelf has been twice in the Highlands of Scotland, and has found very few hills of any height which were cloathed with wood; the trouble therefore of carrying it up to the top of ſuch a mountain would be very conſiderable. But to this it might eaſily be replied, that we cannot by any means argue from the preſent ſtate of the hills in the Highlands to their ſtate in a very remote period of antiquity. At that time, it is neither impoſſible nor in the leaſt improbable, that moſt of the hills in Scotland were overgrown with wood; or at any rate, there undoubtedly was plenty of peat, which is ſtill uſed as fuel in Scotland, and which affords ſuch a ſtrong heat as to be advantageouſly employed in ſmelting iron*, as we are informed by M. Magellan. A third particular mentioned by Mr Williams is, that theſe inoloſures were intended as places of defence; and in ſupport of this opinion alleges, that there are dried wells found within moſt of them. But on this Mr Barrington obſerves, that ſhelter from the weather was alſo neceſſary "upon the top of a bleak Scotch hill, whilſt whiſky (or a ſucredaneum for it) would be often in greater requeſt than the bare element of water." This objection, however, as well as the laſt, is evidently very frivolous; for theſe buildings might have roofs as well as any other; and whatever neceſſity there might be for whiſky occaſionally, water was certainly an indiſpenſable requiſite.

* See the article *Iron*.

Mr Barrington having thus given his reaſons for diſſenting from the opinion of Mr Williams and the antiquaries juſt mentioned, proceeds to ſtate his own. He tells us, that having travelled for 21 years the moſt mountainous circuit in Wales, he has frequently obſerved incloſures of dry ſtones, particularly

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lately a long tract in the western part of Merionethshire, called in the language of the country *Duffryn*, i. e. *the vale*. On first viewing these small inclosures made with walls of thick stones, he was at a loss to imagine how it could be worth while to construct such strong fences for so inconsiderable a piece of ground as they inclosed: but, on examining the adjacent country, he found it almost entirely covered with stones of a similar kind; and, of consequence, the smaller the space to be cleared, the less expensive would be the removal. "For the same reason (says he), such dry walls are often of a great thickness, and sometimes the corners of the inclosures are filled with stones to a great width, this being the only possible means of procuring pasture." To a practice of the same kind our author would ascribe the origin of the works in question: but the objection occurs very strongly, that the walls in Scotland are vitrified, and it is not to be supposed that such trouble would be taken with fences made in such a fortuitous manner. This objection, our author owns, would indeed be unanswerable, on the supposition that the vitrification was made on purpose to strengthen the walls of the fortress; "but (says he) may not the vitrification have been occasioned by volcanoes, or by what are called *bloomeries?* The same effect may be produced likewise on dry walls of stone by lightning passing along them. The loose stones in either case would not be rejected because they were glassy, and would be piled up in the fence of the inclosure; as the great point upon these occasions is to clear the ground, and remove the incumbering stones to the smallest distance. One of the advocates for the designed and not fortuitous vitrification, says, that the pieces he had procured did not resemble what is called *lava*. But every volcano is not necessarily an Etna or a Vesuvius; and consequently the matter disgorged from the crater must perpetually vary both in substance and form. Vitrified masses, larger or smaller, will likewise be produced by the same means. It may be contended indeed, that pasture thus procured, by clearing the ground, would be more convenient at the bottom or on the sides, than on the top of the hill: but to this I answer, that in rocky countries you must get what pittance you can of soil, and often it will happen that the only detached and removeable stones are on the summit. When such inclosures have been made, they became very convenient for putting cattle into; and hence perhaps some of the wells which Mr Williams hath mentioned."

Our author concludes his dissertation on this subject by observing, that if vitrification answered the purpose of cement, it is very extraordinary that the ancient inhabitants of Scotland did not apply it to the houses or huts in which they constantly lived, but reserved this troublesome and expensive process merely for a fortification, which might not perhaps be used in half a century against an enemy. On this it is almost superfluous to observe, that in the ages of barbarity and bloodshed, in which these inclosures, whether natural or artificial, were supposed to be used as fortresses, war was so frequent, that a defence against an enemy might seem to be necessary every day, instead of once in half a century. Before we proceed further in the argument, however, it will be necessary to give some account of the situation and appearance of these fortresses.

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According to Mr Cardonnel, the largest of them is situated on the hill of Knockfarril, to the south of the valley of Strathpesser, two miles west from Dingwall in Rosshire. The inclosure is 120 feet long and 40 broad within the walls; strengthened on the outside with works at each end. A range of habitations seem to have been erected against, or under, the shade of the outward wall; of which those on the south-side seem to have been higher and larger than those on the north. There are two wells in the middle, which, on being cleared out, filled with water. On the skirts of the hill to the south are many detached buildings; which, from the stratum of dung found on removing the ruins, appear plainly to have been used for securing the cattle. This place seems to have been anciently of consequence, and the residence of some powerful chief, from a road which leads through the hills to the north-west sea. To the east of the works are a number of vitrified ruins, extending for a considerable way along the ridge of the hill. The end next the fort seems to have joined the outer wall, and consisted either of two parallel walls, closed above, with a passage between them under cover, or a high wall broad enough to walk on. In this wall there is the vestige of a break about the middle, over which a bridge has been laid, to be drawn up or removed as occasion might require.

The fort next in consequence to that of Knockfarril is situated on the hill of Craig-Phadrick near Inverness, "which (says Mr Cardonnel) has this peculiar circumstance, that there appears to have been two vitrified walls quite round the area. The inner one seems to have been very high and strong; the outer wall but low: probably the space between was intended for securing their cattle, as there are no remains of dry-stone buildings, such as are found near the rest. Several parts of this outer wall appear quite entire, sticking to the firm bare rock, where it was first run. The area within the inner wall is near 80 paces long, and 27 broad." Of this we have an account† by Alexander Fraser-Tytler, Esq; professor of civil history in the university of Edinburgh, who visited it in the year 1782. The hill itself is a small conical eminence, forming the eastern extremity of that ridge of mountains which bounds Loch-Ness on the north-west side. It is situated about a mile to the north of Inverness, and is accessible on two different quarters, viz. the west and south-east; the former affording entrance by a narrow level ridge joining the hills on Loch-Ness, and the latter by an easy ascent from the high ground above Inverness. On approaching the hill from the west, we first meet with a road cut through the rock from the bottom to the top, in most places 10 feet broad and nearly as deep; winding, for about 70 feet, with an easy serpentine direction, by which we gain an ascent over a steep rock otherwise quite inaccessible from that quarter. This road, in our author's opinion, is undoubtedly the work of art, and the vitrified matter on the top is the only thing which indicates the effect of fire; there being neither an appearance of pumice stone, lava, nor basaltes about the hill otherwise. There is indeed plenty of plum-pudding stone; which

† *Edin. Phil. Transact.* Vol. II. class ii. art. 11.

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which ſome have ſuppoſed to be of the nature of volcanic tufa: but this opinion is rejected by our author as erroneous. "But the circumſtance (ſays he) which in my apprehenſion evinces, in the moſt ſatisfactory manner, that theſe appearances of the effect of fire on the ſummit of this hill are not the operation of nature but of art, is the regular order and diſpoſition of thoſe materials, the form of the ground, and the various traces of ſkill and contrivance which are yet diſcernible, though conſiderably defaced either by external violence or the obliterating hand of time." To inveſtigate this matter regularly, he begins with the winding road already mentioned, and which is evidently cut through the rock for the purpoſe of gaining an eaſy aſcent from the level ridge to the ſummit, which would otherwiſe have been impracticable. In aſcending by this road, there appears, towards the middle, on the right hand, a ſmall platform overhanging the paſſage, and inclining by a very gentle declivity to the very edge of the rock. Four enormous ſtones are placed upon the platform, and on the edge and extremity of it, which have evidently been guided by art into that poſition; it being impoſſible that they could have reſted there, had they been rolled down from the higher parts. The obvious reaſon for placing them in ſuch a poſition has been, that on an alarm of danger they might be projected into the path below, which could be done by the efforts of a very few men; and when this was done, the paſſage would be entirely obſtructed, or at leaſt rendered ſo difficult that it could be defended by a few againſt any number of aſſailants. Some other large ſtones are placed on an eminence to the left, probably with a view to block up an hollow channel, by which an enemy might have attempted to aſcend. When we come to the top of the hill, a few feet below the rampart which crowns the whole, there appears an outward wall, approaching on the ſides of the hill ſo near the upper rampart, as to have only a trench of 10 or 12 feet wide between them. This outward wall is in ſome places ſo low as to be almoſt level with the rock, though in other places it riſes to the height of two or three feet; but even where loweſt, it may be traced by a line of vitrified matter ſticking faſt to the rock all along, and nearly of the ſame breadth, which is about nine feet. The remains of this wall are ſtrongly vitrified, except in one place on the north ſide, where, for about 70 yards, the rampart is formed only of dry ſtones and earth. At the eaſt ſide, where the hill is more acceſſible, there is a prodigious mound of vitrified matter, extending itſelf to the thickneſs of above 40 feet. At the ſouth-eaſt corner, and adjoining to this immenſe mound, is an outwork, conſiſting of two ſemicircular vitrified walls, with a narrow paſs cut through them in the middle: which appears to have been another, and perhaps the principal, entry to the fort.

The inner wall, ſurrounding the ſummit of the hill, incloſes an oblong level area of about 375 yards long and 30 broad, rounded at each of the ends like the outward wall. It is of conſiderable height, and nearly of the ſame thickneſs with the outward one.—It has ſome appearance of having been defended with four turrets or baſtions: but the traces are ſo imperfect, that Mr Tytler does not lay much ſtreſs on his obſervations in this reſpect; a number of ſmall tumuli of earth, with a ſtone in the centre, were more diſcernible. On the eaſt ſide a portion of the internal ſpace appears ſeparated from the reſt by two ranges of ſtones fixed ſtrongly in the earth, and forming a right-angled parallelogram. "This ſeparation (ſays our author) is immediately diſcernible by the eye, from this circumſtance, that the whole of the incloſed ſummit has been moſt carefully cleared from ſtones, of which there is not one to be ſeen, unleſs thoſe that form this diviſion, and the ſingle one in the middle of the circle of tumuli above mentioned. What has been the deſign of this ſeparated ſpace, it is difficult to conjecture. It might perhaps have marked the reſidence of thoſe of a higher rank, or ſerved as a temple for the purpoſes of devotion." On the eaſt end of the large area on the ſummit is a well of about ſix feet in diameter, which has probably been ſunk very deep in the rock, though now it is filled up with rubbiſh to within a yard of the top.

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The other fortified hills mentioned by Mr Cardonnel are thoſe of Dun-Evan in the ſhire of Nairn; Tordun caſtle, near Fort Auguſtus; and another on the weſt ſide of Gleneves in Lochaber, three miles to the ſouth of Fort William. The Caſtle-hill of Finhaven, in the county of Angus, has likewiſe ſome conſiderable ruins of the ſame kind.

Dun-Evan and the hill of Finhaven have likewiſe been viſited by Mr Tytler, who gives an account of them in the paper already quoted; of which the following is an abſtract. "On the ſummit of the hill of Dun-Evan, whoſe name implies that it had been originally a place of defence, are the remains of two walls ſurrounding an oblong ſpace like that of Craig-Phadrick already deſcribed, but ſomewhat ſmaller in ſize. [Mr Cardonnel ſays that it is about 70 paces long and 30 broad]. There are likewiſe the traces of a well in the incloſed area; and at the eaſt end are the remains of a prodigious maſs of building, much more extenſive than that on Craig-Phadrick." Here, however, our author could not perceive any marks of fire; and Mr Williams owns that the vitrified ruins here are more waſted than on Knockfarril or Craig-Phadrick. But with regard to the vitrifications here, our author is inclined to ſuppoſe Mr Williams to have been entirely in a miſtake. On the Caſtle-hill of Finhaven, however, the vitrified remains are very viſible all round the ſummit, which is cleared of ſtones and levelled, unleſs at one end, where there is a great hollow ſpace ſeparated from the reſt of the area, and probably deſtined excluſively for the keeping of cattle. The incloſed area is about 140 yards long and upwards of 40 broad.

Beſides theſe fortifications, the hill of Noth affords a remarkable appearance of the ſame kind: of which Mr Cordiner gives the following deſcription, not from his own obſervation, but thoſe of a gentleman of credit who viſited the place. "On the top of the hill there is an oblong hollow, as I could gueſs, of about an Engliſh acre, covered with a fine ſward of graſs: in the middle toward the eaſt end of this hollow is a large and deep well. The hollow is ſurrounded on all ſides with a thick rampart of ſtones. On three ſides of this rampart, from 8 to 12 feet thick, is one compact body of ſtones and minerals which have been in a ſtate of fuſion, reſembling a mixture of ſtone and

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iron-ore, all vitrified, calcined, and incorporated. On the north ſide, the rampart conſiſts of broken pieces of rock, which have the appearance of having been torn to pieces by ſome extraordinary violence. If the calcined compact wall exiſts under them, it is not at preſent viſible."

Such are the deſcriptions of the moſt remarkable of theſe curious fortifications, which of late ſeem to have engaged the attention of the learned in a conſiderable degree. We have already taken notice, that by ſome they are ſuppoſed to be the works of art, by others the productions of a volcano. Mr Cardonnel adopts the opinion of Mr Williams as the moſt probable, both with reſpect to their uſe and manner of conſtruction. Mr Tytler takes notice of the remarkable difference of opinion among thoſe who have viewed the places in queſtion. "It is curious to remark (ſays he) how the ſame appearances, to different obſervers, lead to the moſt oppoſite opinions and concluſions. The two gentlemen above-mentioned (Mr Williams and Dr Anderſon), ſeem not to have entertained the ſmalleſt doubt, that the vitrified materials on the tops of theſe hills were the veſtiges of works of art, and the remains of ſtructures reared for the purpoſes of ſecurity and defence. The biſhop of Derry, when on a tour to the north of Scotland, viſited the hill of Craig-Phadrick near Inverneſs, and expreſſed his opinion, that the mounds of vitrified matter were not the remains of any artificial work, but the traces of an ancient volcano. In the Phil. Tranſ. of the Royal Society of London for 1777, Part II. n° 20. is an account of *Creek Faterick*, there termed *a Volcanic hill near Inverneſs*, in a letter from Thomas Weſt, Eſq; to Mr Law, F. R. S. in which the writer does not heſitate to pronounce this hill an extinguiſhed volcano: and having ſent ſpecimens of the burnt matter for the inſpection of the Royal Society, the ſecretary ſubjoins a note to the paper, intimating, that theſe ſpecimens having been examined by ſome of the members well acquainted with volcanic productions, were by them judged to be real lava. Such was likewiſe the opinion of the late Andrew Croſbie, Eſq; who, in an account which he gave to the Philoſophical Society of Edinburgh in 1780, offered ſome very curious conjectures with regard to the proceſs of nature, by which he ſuppoſed the whole of this hill to have been thrown up from the bottom of the ſea by the operation of inteſtine fire.

Mr Tytler agrees with thoſe who think the vitrified ſtructures to be artificial works; but he differs from Mr Williams and others, who think that they were vitrified on purpoſe for cementing the materials together. His reaſon for this is, that the number of forts that ſhow marks of vitrification is inconſiderable when compared with thoſe that do not. He therefore conſiders the vitrification as accidental; and that it muſt have been accompliſhed in the following manner. In the rude ſtate in which we muſt ſuppoſe Scotland to have been in early times, it is very probable that their buildings, both for habitation and defence, would be frequently conſtructed of looſe ſtones of an irregular ſhape; of which, by themſelves, it would ſcarce be poſſible to fabricate a wall of any tolerable ſtrength. Hence it became neceſſary to uſe wood as well as ſtone in their conſtruction. This kind of building then, in our author's opinion, was begun by raiſing a double row of palliſades or ſtrong ſtakes in the form of the intended ſtructure, in the ſame way as in that ancient mode of building deſcribed by Palladio under the name of *riempiuta a caſſa*, or coffer-work. Theſe ſtakes were probably warped acroſs by boughs of trees laid very cloſely together, ſo as to form two fences running parallel to each other at the diſtance of ſome feet, and ſo cloſe as to confine all the materials of whatever ſize that were thrown in between them. Into this intermediate ſpace Mr Tytler ſuppoſes were thrown boughs and trunks of trees, earth and ſtones of all ſizes, large or ſmall as they could quarry or collect them. Very little care would be neceſſary in the diſpoſition of theſe materials, as the outward fence would keep the mound in form. In this way it is eaſy to conceive that a very ſtrong bulwark might be reared with great diſpatch; which, joined to the natural advantage of a very inacceſſible ſituation, and that improved by artful contrivances for increaſing the difficulty of acceſs, would form a ſtructure capable of anſwering every purpoſe of ſecurity or defence. The moſt formidable attack againſt ſuch a building would be fire, which would no doubt be always attempted, and often with ſucceſs, by an enemy who undertook the ſiege. If the beſiegers prevailed in gaining an approach to the ramparts, and, ſurrounding the external wall, ſet fire to it in ſeveral places, the conflagration muſt ſpeedily have become univerſal, and the effect may be eaſily imagined. If there happened to be any wind at the time to increaſe the heat, the ſtony parts could not fail to come into fuſion; and as the wood burnt away, ſinking by their own weight into a ſolid maſs, there would remain a wreck of vitrified matter tracking the ſpot where the ancient rampart had ſtood; irregular, and of unequal height, from the fortuitous and unequal diſtribution of the ſtony materials of which it had been compoſed. This conjecture appears very probable from their appearance at this day. They do not ſeem to have ever been much higher than they are at preſent, as the fragments that have fallen from them, even where the wall is loweſt, are very inconſiderable. The durable nature of the materials would prevent them from ſuffering any changes by time; though, from the gradual increaſe of the ſoil, they muſt in ſome places have loſt conſiderably of their apparent height, and in others been quite covered. Mr Williams, in making a cut through the ramparts at Knockfarril, found in many places the vitrified matter covered with peat-moſs half a foot thick.

Vitrified Forts.

In confirmation of this opinion, our author likewiſe urges, that in the fortification on Craig Phadrick, a large portion of the outward rampart bears no marks of vitrification. The reaſon of this ſeems to be, that the ſteepneſs of the hill on that ſide renders a low fence of ſtones and turf ſufficient; and no wood had probably been employed in its conſtruction. "It appears therefore highly probable (concludes our author), that the effect of fire upon theſe hill-fortifications has been entirely accidental; or, to ſpeak more properly, that fire has been employed, not in the conſtruction, but towards the demolition of ſuch buildings: and for the latter purpoſe it would certainly prove much more efficacious than for the former. It is much to be doubted, whether it would be at all poſſible, even in the preſent

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Vitrified Forts.

ſent day, by the utmoſt combination of labour and of ſkill, to ſurround a large ſpace of ground with a double rampart of ſtones compacted by fire, of ſuch height and ſolidity as to anſwer any purpoſe of ſecurity or defence againſt an enemy. Any ſtructure of this kind muſt have been irregular, low, fragile, eaſily ſcaled, and quite inſecure; a much weaker rampart, in ſhort, than a ſimple wall of turf or wooden palliſade. The veſtiges yet remaining, as I have already obſerved, give no room to ſuppoſe that the vitrified mound has ever been much more entire than it is at preſent. The effect of fire upon ſtructures reared in the manner I have ſuppoſed them to have been, will account moſt perfectly for their preſent appearance. It was from neceſſity that the builders of theſe fortifications betook themſelves to a mode of ſtructure ſo liable to be deſtroyed by fire. In thoſe parts where ſtones could be eaſily quarried, of ſuch ſize and form as to rear a rampart by themſelves of ſufficient ſtrength and ſolidity, there was no occaſion to employ wood or turf in its conſtruction; and it was therefore proof againſt all aſſaults by fire. Such are the ramparts which appear on the hill of Dun-Jardel, Dun-Evan, and many others, on which there is not the ſmalleſt appearance of vitrification. But on Craig Phadrick, and the other hills above deſcribed, where, from the nature of the rock, the ſtones could be procured only in irregular and generally ſmall fragments, it was neceſſary to employ ſome ſuch mode of conſtruction as I have ſuppoſed; and theſe ramparts, though ſolid and well calculated for defence againſt every attack by force or ſtratagem, were not proof againſt an aſſault by fire."

Mr Cordiner is of opinion, that the vitrifications in queſtion cannot have been the works of art, and ridicules the contrary hypotheſis; though without adducing any argument againſt it. The Hill of Noth is by him ſuppoſed to have been a volcano. He deſcribes it as "a moſt majeſtic mountain, in general brown, with moſs and heath, interſperſed with bare rock, in many places crumbling down. The higheſt part of it is a circular hill, whoſe verdure, as well as height, diſtinguiſhes it from the reſt of the mountain. This is called the *Top of Noth;* and bears the ſtrongeſt reſemblance to every deſcription of a volcanic mount. At the diſtance of many miles, one can diſtinguiſh thoſe ridges which are the boundaries of the crater, indicating the hollow in the top." The gentleman from whom Mr Cordiner received the account of the vitrifications on the ſummit, informs us, that on firſt ſeeing ſpecimens of them, he imagined that they had been pieces of ſtone calcined by the burning down of a caſtle; as he had found ſomething very like them on the caſtle-hill at Cullen, in parts where the ſward of graſs was broken: but on reaching the top, and viewing the appearances on it already deſcribed, he altered his opinion. "That men hardly beſet (ſays he) might climb up with ſome proviſions to this as a place of refuge, is probable: but that, on a barren mountain-top, far from cultivated ground, half a day's journey from the plain; that there, in any period of ſociety, man ſhould have been tempted to build that amazing rampart, is not to be imagined: they have found it a natural and extenſive fortreſs, and in critical circumſtances have made uſe of it accordingly. That it has been occupied as a place of ſtrength and of refuge, is very evident; for, ſome hundred yards down lower on the hill, there are the remains of another rampart or wall, conſiſting of looſe ſtones piled together without any cement, carried quite round the hill. This laſt has been built for an additional defence to thoſe who made their abode on the top. The top of Noth, for two-thirds downwards, is covered with a green ſward; below that, it is brown with heath: this is the very reverſe of the adjacent mountains; and the greater verdure of the upper part I imputed to a new ſoil created by the aſhes of the volcano. The opening, called a *well*, I ſuppoſe to have been the lateſt crater. About a mile ſouth, down towards the lower grounds of the *Cabrock*, there is a very pretty regular green hill, which I aſcribe to a later eruption than thoſe which may have formed the contiguous hills now covered with heath. There is an extraordinary luxuriant ſpring of water ruſhes out at once from the ſide of the hill of Noth; which is likewiſe ſome confirmation of the opinion that a volcano has ſome time exiſted there, which has occaſioned great hollows and reſervoirs of water in the heart of the mountain. And the wild irregularities of nature through all the Cabrock, the hideous and ſtrange projection of rocks from the ſides of the hills, would ſeem to indicate ſome vaſt convulſions which the earth muſt have ſuffered in theſe parts.

Vitrified Forts.

"The traces of ancient volcanoes (ſays Mr Cordiner) are far from being unfrequent in Scotland. The hill of Finhaven is one inſtance; and not only abundant in this ſpecies of lava, but with *tarras*, or the *pulvis puteolanus*, an *amalgama*, as Condamine calls it, of calcined ſtones mixed with ſcorias and iron-ruſt reduced to powder. The hill of Beregonium, near Dunſtaffage caſtle, is another, yielding vaſt quantities of pumices or ſcoria of different kinds; many of which are of the ſame ſpecies with thoſe of the volcanic Iceland. The noble aſſemblage of baſaltic columns at Staffa, thoſe in the Iſle of Sky, and the rock Humble, are but ſo many evidences of the ancient volcanoes of this country. And finally, the immenſe ſtratum of pumex vitreus or Iceland agate, on the hill of Dun-fuin in Arran, is the laſt proof I ſhall bring in ſupport of the queſtion."

On this diſpute we can only obſerve, that whatever ſide we embrace, the difficulties ſeem to be very great, nay almoſt inſurmountable. When we conſider the great thickneſs of the walls on the top of Noth, from 8 to 12 feet, and the vaſt mound of vitrified matter, no leſs than 40 feet in breadth, mentioned by Mr Tytler, we can ſcarce conceive it poſſible that leſs than a volcanic fire could be able to form them. We may eaſily allow, that, in the way this gentleman mentions, there might be conſiderable vitrifications formed; but that ſuch immenſe maſſes ſhould be brought into perfect fuſion by the ſmall quantity of fuel which could be put round them in paliſades, or intermixed with the materials themſelves, will be incredible to every one acquainted with the extreme difficulty with which ſtones of any magnitude are brought into complete fuſion. We ſee even in the inſides of furnaces, though ſometimes built of no more unfuſible materials than common brick, no ſuch effects follow. There is a ſlight vitrification indeed, but it ſcarce ever penetrates to the depth of an inch or two, though very violent fires are kept

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Vitrified Forts.

kept up for a much longer time than we could ſuppoſe the wood ſurrounding thoſe walls to require for its being conſumed. In conflagrations, where houſes are conſumed, which are the only ſimilar examples we have, no ſuch effect is perceived. Even in the great fire at London in 1666, where ſo many buildings were deſtroyed, we do not hear of their walls being vitrified, though the materials of many of them were undoubtedly as fuſible as the rocks and ſtones of Craig-Phadrick, or the Top of Noth. If, on the other hand, we reject this, and adhere to the volcanic hypotheſis, our difficulties are equally great. For where ſhall we find in any other part of the world an example of volcanoes ejecting lava in the form of walls incloſing a regular area? This would be attributing ſuch a ſingularity to the volcanoes of Scotland as the moſt extravagant imagination cannot admit. We muſt therefore conclude, that though theſe ruins are certainly the works of art, we have not yet ſufficient data to decide the queſtion with reſpect to their conſtruction, but that the ſubject requires a farther inveſtigation.

In the paper already quoted, Mr Tytler obſerves, that "theſe ancient fortifications preſent a more curious and intereſting object of ſpeculation, than thoſe uncertain and indeed fruitleſs conjectures as to the mode in which they have been reared." This, he juſtly obſerves, muſt have been before the uſe of mortar was known; for as the country abounded in limeſtone, and the builders certainly would exert all their powers in giving them a proper degree of ſtrength, it would undoubtedly have been uſed. Hence we are led to aſcribe to theſe a very conſiderable degree of antiquity; for as the Britons were taught the uſe of mortar by the Romans, it is probable that we muſt date the origin of the ſtructures in queſtion before the time of the invaſion of that people, or at leaſt ſoon after it: ſo that we muſt look upon them to be more than 1650 years old; but how far beyond that period we are to ſearch for their origin, does not appear. "All that we can conclude with certainty (ſays our author) is, that they belong to a period of extreme barbariſm. They muſt have been conſtructed by a people ſcarcely removed from the ſtate of ſavages, who lived under no impreſſion of fixed or regulated property in land; whoſe only appropriated goods were their cattle; and whoſe ſole ſecurity, in a life of conſtant depredation, was the retreat to the ſummits of thoſe hills of difficult acceſs, which they had fortified in the beſt manner they could. As the ſpace incloſed was incapable of containing a great number of men, eſpecially if occupied in part by cattle, it is preſumable, that theſe retreats were formed chiefly for the ſecurity of the women and children of the canton and of their herds. They could be defended by a few men, while the reſt of the tribe were engaged with their enemies in the field."

Our author concludes his diſſertation with a conjecture, which indeed ſeems well ſupported, that the forts in queſtion were conſtructed, not only before the Roman invaſion, but before the introduction of the rites of the Druids into Britain; as "there appears no probability that the inhabitants either lived under ſuch a government as we know to have prevailed under the influence of the Druids, or had any acquaintance with thoſe arts which it is certain they cultivated."

Fortalice Forth.

FORTALICE, in Scots law, ſignified anciently a ſmall place of ſtrength, originally built for the defence of the country; and which on that account was formerly reckoned *inter regalia*, and did not go along with the lands upon which it was ſituated without a ſpecial grant from the crown. Now, fortalices are carried by a general grant of the lands; and the word is become ſynonymous with manor-place, meſſuage, &c.

FORTESCUE (Sir John), lord chief juſtice of the king's bench, and lord high chancellor of England, in the reign of king Henry VI. was deſcended from the ancient family of Forteſcue, in the county of Devon. He ſtudied the municipal laws of England in Lincoln's Inn, of which he was made one of the governors in the fourth and ſeventh years of the reign of king Henry VI. In 1430 he was called to the degree of a ſerjeant at law, and in 1441 was conſtituted the king's ſerjeant. The following year he was made lord chief juſtice of the king's bench; in which honourable ſtation he continued till near the end of that king's reign, who ſhowed him many particular marks of his favour, and advanced him to the poſt of lord high chancellor of England. During the reign of king Edward IV. he followed the fortunes of the houſe of Lancaſter, and was many years in exile with queen Margaret and prince Edward her ſon. At length, they having a proſpect of retrieving their deſperate fortunes, the queen and prince returned to England, and Sir John Forteſcue, with many others, accompanied them: but ſoon after the deciſive battle of Tewkſbury, he was thrown into priſon and attainted, with other Lancaſtrians; but found means to procure his pardon from Edward IV. He wrote, 1. A learned commentary on the politic laws of England, for the uſe of prince Edward; to one edition of which Mr Selden wrote notes. 2. The difference between an abſolute and limited monarchy, as it more particularly regards the Engliſh conſtitution (which was publiſhed, with ſome remarks, by John Forteſcue, afterwards lord Forteſcue, in 8vo, in 1714; and a ſecond edition was publiſhed, with amendments, in 1719): And ſeveral works, which ſtill remain in manuſcript. He died near 90 years of age; and was buried in the pariſh church of Ebburton, where a monument was erected to his memory, in 1677, by one of his deſcendants.

FORTH, one of the moſt noble and commodious rivers in Scotland. It takes its riſe near the bottom of Lomond hills; and running from weſt to eaſt, receives in its paſſage many conſiderable ſtreams, deriving their waters from the eminences in the midland counties of North Britain. Between Stirling and Alloa, the Forth winds in a moſt beautiful and ſurpriſing manner; ſo that, though it is but four miles by land, it is 24 by water between theſe two places. Below Alloa the river expands itſelf to a great breadth between the counties of Lothian and Fife, till at Queen's-ferry it is contracted by promontories ſhooting into it from both coaſts; ſo that, from being four or five, there it is not above two miles broad. In the middle of the channel lies a ſmall iſland called *Inchgarvy*, which has a ſpring of freſh water: upon the iſland there is an ancient fort, which has been lately repaired; and if there were either forts or blockhouſes on the oppoſite promontories, that part of the river which lies between Alloa and Queens-ferry would be as ſecure and conve-

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Forth. nient a harbour as could be desired. A little below this, near the north shore, lies Inchcomb, on which are the remains of an ancient monastery of considerable extent; and opposite to Leith stands the island of Inchkeith, formerly fortified, but now in ruins. Below Queens-ferry the north and south shores receding, the body of the water gradually enlarges till it becomes two or three leagues broad, affording several safe harbours on both sides, and excellent roads throughout, unembarrassed with latent rocks, shoals, or sands; and allowing secure anchorage to the largest ships within a league of the coast in almost any part of the Frith, and to vessels of a smaller size within a mile or less. The Firth, or (as it is commonly written) the *Frith*, of Forth, is, at the mouth of it, from North Berwick to Fifeness, full five leagues broad; having the little island of May (on which there is a light-house, and there might also be a fort) in the middle of it, and to the west of this the rocky island of Bass; notwithstanding which, the largest fleet may enter and sail up it many miles with the utmost facility and in the greatest safety. In 1781, Admiral Parker's fleet lay some weeks opposite to Edinburgh, accompanied by 500 sail of merchantmen, the whole in full view of the city and castle.

The Forth was known to the ancients by the name of *Bodotria*, or (as Ptolemy calls it) *Boderia*, and has been ever famous for the number of its havens: some of which are, indeed, in their present condition, scarce worthy of that name. It is navigable for merchantmen as high as Alloa, 50 miles from the sea; and for coasters as far as Stirling, 24 miles further by water, though only four by land in a direct line, as already observed. The tide flows only a full mile above Stirling to a place called *Craigforth*, where the proprietor intercepts the passage of the salmon by a cruive or weir, very injurious to the large tract of country, which stretches as far as Lomond westward. The river from Stirling to the bridge of Aberfoil, at the entrance into the West Highlands, is only passable for man or horse at few places, and these in dry seasons. It glides gently through a dead flat, from Gartmore eastward; "and on these accounts (says Mr Knox*) it might be made navigable for barges, at a trifling expence to the proprietors of the lands, an improvement much wanted in a rich, extensive, and populous valley, without market towns, coal and lime. Supposing this work to be executed, of which there is some probability, the whole extent of navigation on the Forth, will, including all its windings, exceed 200 miles, through a coast of nearly 100 miles; fertile, populous, industrious; and from Stirling eastward, almost lined with towns, anciently the seats of commerce and navigation, till they were ruined by the English depredations; in which miserable state some of them still remain, while others begin to resume the appearance of business. The principal object of these towns was the fisheries, which they prosecuted with great vigour as far as Iceland, till the time of the Union, from which period the eastern fisheries gradually dwindled away; and the poor fishermen, unable to subsist themselves upon air and water, took up the trade of smuggling; but so soon as the fishery laws shall be amended, the salt duties abolished, and an adequate bounty extended to boats as well as busses, these people will readily fall into the track of their ancestors, live by honest industry, and add new vigour to our naval strength. Many of the ports are nearly choaked up, others want repairs, which neither the individuals nor the corporations of those decayed places can accomplish. Though the harbours on the Forth are in general small, the depth of water might be made sufficient for vessels of 200 tons burden, which fully answers the purposes of their coasting and Baltic trade; but to obtain this, or even a less depth of water, an aid of 50,000 l. would be requisite." Forth.

By this river and the Clyde, Scotland is almost divided into two parts. The Forth falls into the east sea below Edinburgh, and has an easy communication with the whole eastern coast of Great Britain; with France, Ostend, Holland, Hamburgh, Prussia, Dantzic, Russia, Sweden, Denmark, Norway, and Greenland. The Clyde falls into the Atlantic ocean below Glasgow, and communicates with the western coast of Great Britain; with Ireland, the south of France, Portugal, Spain, the Mediterranean, America, and the West Indies. These two rivers, thus falling in opposite directions into the two seas which environ our island, and the neck of land between them amounting scarcely to 24 miles, gave rise to the idea of a junction, so as to open a communication across the kingdom, and thereby cut off the long dangerous navigation by the Land's End and the Pentland Frith: an object of vast utility, and which has lately been happily accomplished. See the article CANAL.

* *View of the British Empire*, vol. ii. p. 518.

FORTIFICATION;

THE art of fortifying a town, or other place; or of putting them in such a posture of defence, that every one of its parts defends, and is defended by, some other parts, by means of ramparts, parapets, moats, and other bulwarks; to the end that a small number of men within may be able to defend themselves for a considerable time against the assaults of a numerous army without, so that the enemy in attacking them must of necessity suffer great loss.

The origin and rise of fortification is undoubtedly owing to the degeneracy of mankind. In the first ages of the world, men were dispersed up and down the countries in separate families, as we are told in the histories of the Jews and Scythians, who wandered from one place to another, for the sake of finding pasture for their cattle. These families became in time so numerous as to form large communities, which settled all together in a place; from whence villages and towns had their origin and rise: but they found it was necessary, for the common security, to surround those towns with walls and ditches, to prevent all violences *from their neighbours, and sudden surprises*. This was sufficient for some time, till offensive weapons were invented, and conquering became a fashion. Then walls with

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with loop-holes were made at proper distances, in order to screen the defenders against the arrows of the assailants: but finding that, as soon as the enemy got once close to the walls, they could from no part be discovered or repulsed; for this reason they added square towers at proper distances from each other, so that every part of the wall might be defended by the adjacent sides of the towers. However, this manner of inclosing of towns was found to be imperfect, because there remained still one of the faces of the towers which fronted the field that could not be seen from any other part, and therefore could not be defended. To remedy this, they made the towers round instead of square, imagining this figure to be the strongest to resist the battering engines, as likewise to be better defended from the other parts of the wall.

Notwithstanding the superiority of this method above the former, there remained yet a part of these towers unseen and incapable of being defended; which made them change the figure of the towers again; that is, they made them square as before; but, instead of presenting a face to the field as formerly, they presented an angle; by this means they effectually found out such a disposition of their works, that no part could be attacked without being seen or defended by some other part.

This last method was in use a long while; and would in all probability have continued to this day, if gunpowder had not been found out: but the violence of the guns and mortars soon convinced the world, that such towers and walls were but a weak defence against these thundering engines; and besides, as the nature of the attack was entirely changed, it was also necessary to change that of fortifying likewise.

From that time ramparts were added to the walls, the towers enlarged into bastions, and all sorts of outworks have been added, such as ravelins, counterguards, horn and crown works, and others of the like nature, in order to render the defence in some measure equivalent to the attack.

Notwithstanding all the improvements which have been made in the art of fortifying since the invention of gun-powder, that of attacking is still superior to it: engineers have tried in vain to render the advantages of a fortification equal to those of the attack; the superiority of the besiegers fire, together with the greater number of men, obliges generally, sooner or later, the besieged to submit.

The greatest improvement made in the art of attacking happened in the year 1697, when M. Vauban made first use of ricochet-firing at the siege of Ath, whereby the besieged placed behind the parapets were as much exposed to the fire of the besiegers as if there had been none; whereas, before, they had been secure as long as the parapet was not demolished: and the worst is, that there can be no remedy found to prevent this enfilading, without falling into inconveniencies almost as bad as those which we endeavour to avoid.

Fortification is either regular or irregular. *Regular* fortification, is that built in a regular polygon, the sides and angles of which are all equal, being commonly about a musket-shot from each other. *Irregular* fortification, on the contrary, is that where the sides and angles are not uniform, equidistant, or equal; which is owing to the irregularity of the ground, valleys, rivers, hills, and the like. Vauban's Method.

Sect. I. *Of Regular Fortification.*

Although authors agree as to the general form in the present manner of fortifying, yet they mostly differ in particular constructions of the parts. As it would be both needless and superfluous to treat of all the different methods hitherto proposed, we shall content ourselves with explaining those only which are most esteemed by the best judges, and have been mostly put in practice.

Construction of M. Vauban's Method.

This method is divided into little, mean, and great; the *little* is chiefly used in the construction of citadels, the *mean* in that of all sorts of towns, and the *great* in particular cases only.

We shall give the construction of the mean, as being most useful; and refer the reader to the table hereafter, for those dimensions which are different in these several fortifications. Plate CXCVII.

Inscribe in a circle a polygon of as many sides as the fortification is designed to have fronts; let AB be one of the sides of half an hexagon, which bisect by the perpendicular CD; divide half AC of it into nine equal parts, and one of these into ten others; then these divisions will serve as a scale to construct all the parts of the fortification, and each of them is supposed to be a toise or fathom, that is, six French feet; and therefore the whole side AB is supposed to be 180 toises.

As the dividing a line into so many equal parts is troublesome and tedious; it is more convenient to have a scale of equal parts by which the works may be constructed.

If therefore, in this case, the radius is taken equal to 180 toises, and the circle described with that radius being divided into six equal parts, or the radius being carried six times round, you will have an hexagon inscribed; AB being bisected by the perpendicular CD as before, set off 30 toises from C to D, and draw the indefinite lines ADG, BDF; in which take the parts AE, BH, each equal to 50 toises; from the centre E describe an arc through the point H, meeting AD in G, and from the centre H describe an arc through the point E, meeting BD in F; or which is the same, make each of the lines EG, HF, equal to the distance EH; then the lines joining the points A, E, F, G, H, B, will be the principal or outline of the front.

If the same construction be performed on the other sides of the polygon, you will have the principal or outline of the whole fortification.

If, with a radius of 20 toises, there be described circular arcs, from the angular points B, A, M, T, and lines are drawn from the opposite angles E, H, &c. so as to touch these arcs, their parts *ab*, *bc*, &c. together with these arcs, will represent the outline of the ditch.

Definitions.

1. The part FEALN, is called the bastion.
2. AE, AL, the faces of the bastion.
3. EF, LN, the flanks.
4. FG, the curtain.

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Of Orillons. Plate CXCVII.

5. FN, the gorge of the baſtion.
6. AG, BF, the lines of defence.
7. AB, the exterior ſide of the polygon.
8. CD, the perpendicular.
9. Any line which divides a work into two equal parts, is called the capital of that work.
10. *a b c*, the counterſcarp of the ditch.
11. A, M, the flanked angles.
12. H, E, L, the angles of the ſhoulders or ſhoulder only.
13. G, F, N, the angles of the flank.
14. Any angle whoſe point turns from the place is called a *ſalient angle*, ſuch as A, M: and any angle whoſe point turns towards the place, *re-entering angle*, ſuch as *b*, F, N.
15. If there be drawn two lines parallel to the principal or outline, the one at 3 toiſes diſtance, and the other at 8 from it; then the ſpace *y x* included between the principal one, and that farthеſt diſtant, is called the *rampart*.

And the ſpace *x x*, contained by the principal line, and that next to it, and which is generally ſtained black, is called the *parapet*.

16. There is a fine line drawn within four feet of the parapet, which expreſſes a ſtep called *banquette*.

N. B. All works have a parapet of three toiſes thick, and a rampart of 8 to 10, beſides their ſlopes. The rampart is elevated more or leſs above the level of the place, from 10 to 20 feet, according to the nature of the ground and the particular conſtructions of engineers.

The parapet is a part of the rampart elevated from 6 to 7½ feet above the reſt, in order to cover the troops which are drawn up there from the fire of the enemy at a ſiege; and the banquette is two or three feet higher than the rampart, or about four feet lower than the parapet; ſo that when the troops ſtand on it, they may juſt be able to fire over the parapet.

17. The body of the place, is all that which is contained within this firſt rampart; for which reaſon, it is often ſaid to conſtruct the body of the place; which means properly, the conſtruction of the baſtions and curtains.

18. All the works which are conſtructed beyond the ditch before the body of the place are called *out-works*.

Of Ravelins. Plate CXCVII.

TABLE.

	Forts.						Little Fortif.				Mean.		Great.	
Side of Polyg.	80	90	100	110	120	130	140	150	160	170	180	190	200	260
Perpendicul.	10	11	12½	14	15	16	20	21	23	25	30	35	25	22
Faces baſt.	22	25	28	30	33	35	40	42	45	47	50	53	55	60
Cap. of ravel.	25	28	30	35	38	40	45	50	50	52	55	55	60	50

In the firſt vertical column are the numbers expreſſing the lengths of the exterior ſides from 80 to 260. In the ſecond, the perpendiculars anſwering to theſe ſides. In the third, the lengths of the faces of baſtions; and in the fourth, the lengths of the capitals of the ravelins.

The forts are moſtly, if not always, regular; for which reaſon, the perpendiculars are made one-eighth of the exterior ſides; becauſe if they were more, the gorges of the baſtions would become too narrow.

The little fortification is chiefly deſigned for citadels, and are commonly pentagons; the perpendiculars are made one-ſeventh of the exterior ſide: the mean is uſed in all kinds of fortifications from an hexagon upwards to any number of ſides: and the great is ſeldom uſed but in an irregular fortification, where there are ſome ſides that cannot be made leſs without much expence; or in a town which lies near a great river, where the ſide next the river is made from 200 to 260 toiſes; and as that ſide is leſs expoſed to be attacked than any other, the perpendicular is made ſhorter, which ſaves much expence.

The faces of the baſtions are all ⅓ths of the exterior ſides, or nearly ſo, becauſe the baſtions are neglected.

It may be obſerved in general, that in all ſquares the perpendicular is ⅛th of the exterior ſide, and all pentagons ⅐th, and in all the reſt upward ⅙th.

1. *Conſtruction of Orillons and retired Flanks.*

Describe the front MPQRST as before, and divide the flank into three equal parts, of which ſuppoſe S *r* to be one: from the oppoſite flanked angle M draw a line M *r*, in which take the part *s r* of 5 toiſes; take likewiſe R *n* in the line of defence GR, produced, alſo 5 toiſes, and join *s n*, upon which as a baſe deſcribe the equilateral triangle *s p n*, and from the angle *p*, oppoſite to the baſe as centre, is deſcribed the circular flank *n m*.

And if S *r* be biſected by the perpendicular 1, 2, and another be erected upon the face S T, at S; the interſection 2 of theſe two perpendiculars will be the centre of the arc which forms the orillon.

The orillons are very uſeful in covering the retired flanks, which cannot be ſeen but directly in the front; and as theſe orillons are round, they cannot be ſo eaſily deſtroyed as they would be if they were of any other figure.

2. *Conſtruction of Ravelins or Half moons.*

Fig. 2. Set off 55 toiſes from the re-entering angle O of the counterſcarp, on the capital O L or on the perpendicular produced, and from the point L draw lines to the ſhoulders A B; whoſe parts L M, L N, terminated by the counterſcarp, will be the faces, and M O, O N, the ſemi-gorges of the ravelin required.

This is Mr Vauban's method of conſtructing ravelins, according to ſome authors: and others will have the faces of the ravelin to terminate in thoſe of the baſtions within 3 toiſes of the ſhoulders; which ſeems to be the beſt way, for theſe ravelins cover the flanks much better than the others.

The ditch before the ravelin is 12 toiſes, its counter-

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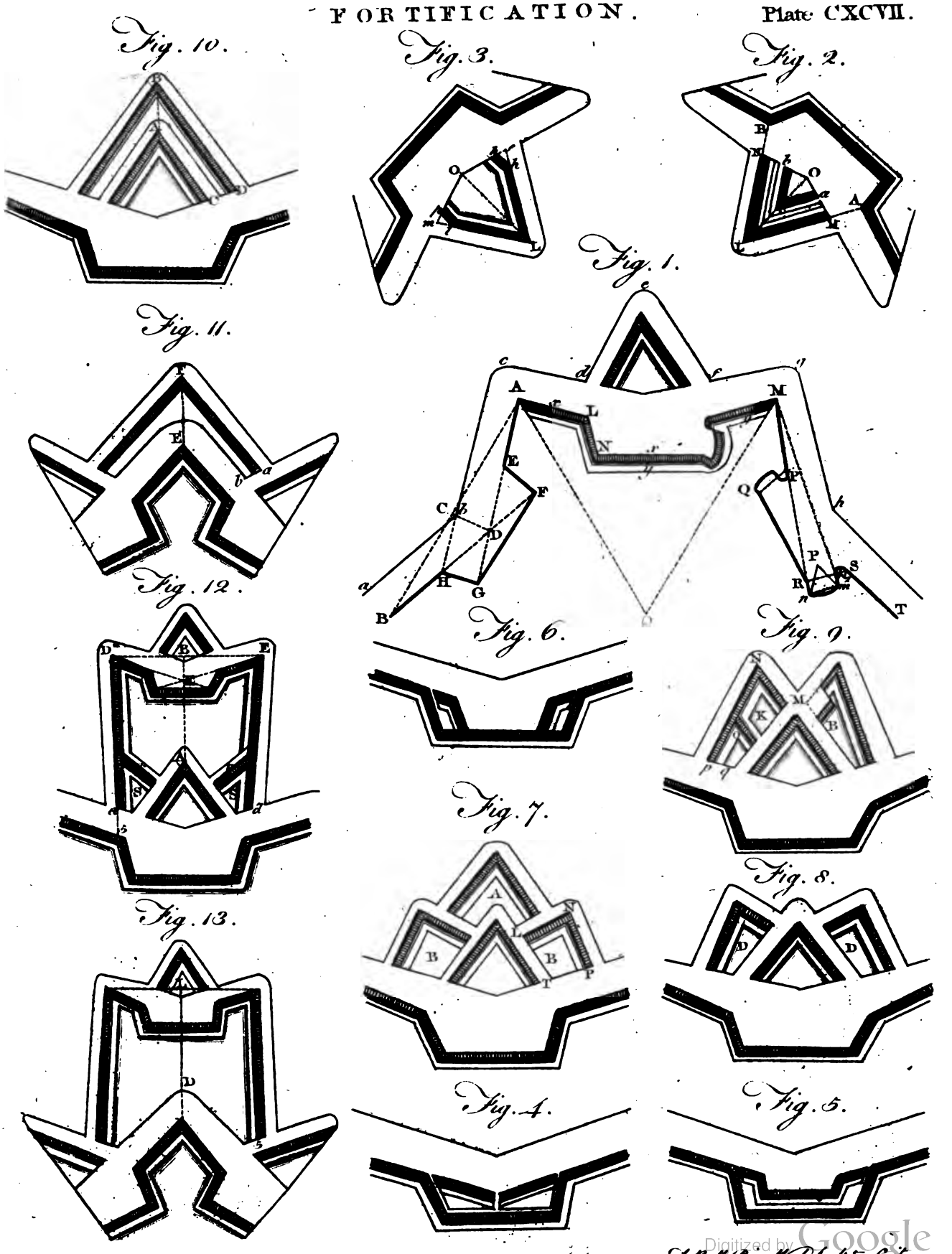

A. Bell Prin. Wal. Sculptor fecit.

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Of Tenailles. Plate CXCVII.

ſcarp parallel to the faces of the ravelins; and is made in a circular arc, before the ſaliant angle; as likewiſe all ditches are in general.

When the ravelins are made with flanks, as in fig. 3. the faces ſhould terminate on thoſe of the baſtions, at leaſt 5 toiſes from the ſhoulders.

The flanks are made by ſetting off 10 toiſes from the extremities of the faces, from *f* to *b*, and from *m* to *l*; and from the points *b*, *l*, the flanks *b k*, *l p*, are drawn parallel to the capital LO of the ravelin.

There are ſometimes redoubts made in the ravelin, ſuch as in fig. 2. which is done by ſetting off 16 toiſes from the extremities of the faces on the ſemi-gorges from N to *b*, and from M to *a*; and from the points *b*, *a*, the faces are drawn parallel to thoſe of the ravelin: the ditch before the redoubt is 6 toiſes, and its counterſcarp parallel to the faces.

3. *Conſtruction of Tenailles.*

A tenaille is a work made in the ditch before the curtains, the parapet of which is only 2 or 3 feet higher than the level ground of the ravelin. There are three different ſorts: the firſt are thoſe as in fig. 4. which are made in the direction of the lines of defence, leaving a paſſage of 3 toiſes between their extremities and the flanks of the baſtions, as likewiſe another of 2 in the middle for a bridge of communication to the ravelin.

The ſecond ſort are thoſe as in fig. 5. Their faces are in the lines of defence, and 16 toiſes long, beſides the paſſage of 3 toiſes between them and the flanks of the baſtions; their flanks are found by deſcribing arcs from one ſhoulder of the tenaille as centre through the other, on which are ſet off 10 toiſes for the flanks deſired.

And the third ſort are thoſe as in fig. 6. Their faces are 16 toiſes, as in the ſecond ſort, and the flanks are parallel to thoſe of the baſtions.

The uſe in general of tenailles, is to defend the bottom of the ditch by a grazing fire, as likewiſe the level ground of the ravelin, and eſpecially the ditch before the redoubt within the ravelin, which can be defended from no where elſe ſo well as from them.

The firſt ſort do not defend the ditch ſo well as the others, as being too oblique a defence; but as they are not ſubject to be enfiladed, M. Vauban has generally preferred them in the fortifying of places, as may be ſeen in the citadel of Lille, at Laudau, New Briſac, and in a great many other places.

The ſecond ſort defend the ditch much better than the firſt, and add a low flank to thoſe of the baſtions; but as theſe flanks are liable to be enfiladed, they have not been much put in practice. This defect might however be remedied, by making them ſo as to be covered by the extremities of the parapets of the oppoſite ravelins, or by ſome other work.

As to the third ſort, they have the ſame advantage as the ſecond, and are likewiſe liable to the ſame objections; for which reaſon, they may be uſed with the ſame precautions which have been mentioned in the ſecond.

Tenailles are eſteemed ſo neceſſary, that there is hardly any place fortified without them: and it is not without reaſon. For when the ditch is dry, the part behind the tenailles ſerves as a place of arms, from which the troops may ſally, deſtroy the works of the enemy in the ditch, oppoſe their deſcent, and retire with ſafety; and the communication from the body of the place to the ravelin becomes eaſy and ſecure: which is a great advantage; for by that means the ravelin may be a much better defence, as it can be ſupplied with troops and neceſſaries at any time. And if the ditch is wet, they ſerve as harbours for boats, which may carry out armed men to oppoſe the paſſage over the ditch whenever they pleaſe; and the communication from the tenailles to the ravelin, becomes likewiſe much eaſier than it would be without them.

Of Lunettes, &c. Plate CXCVII.

4. *Conſtruction of Lunettes.*

FIG. 7. Lunettes are placed on both ſides of the ravelin, ſuch as B, to increaſe the ſtrength of a place: they are conſtructed, by biſecting the faces of the ravelin with the perpendicular LN; on which is ſet off 30 toiſes from the counterſcarp of the ditch, for one of its faces; the other face, PN, is found by making the ſemi-gorge TP of 25 toiſes; the ditch before the lunettes is 12 toiſes, the parapet 3, and the rampart 8, as in the ravelin.

There is ſometimes another work made to cover the ſaliant angle of the ravelin, ſuch as A, called *bonnet*, whoſe faces are parallel to thoſe of the ravelin, and when produced biſect thoſe of the lunettes; the ditch before it is 10 toiſes.

There are likewiſe lunettes, ſuch as D in fig. 8. whoſe faces are drawn perpendicular to thoſe of the ravelin, within a third part from the ſaliant angle; and their ſemi-gorges are only 20 toiſes.

Theſe kind of works may make a good defence, and coſt no very great expence; for as they are ſo near the ravelin, the communication with it is very eaſy, and one cannot well be maintained till they are all three taken.

5. *Conſtruction of Tenaillons.*

FIG. 9. Produce the faces of the ravelin beyond the counterſcarp of the ditch, at a diſtance MN of 30 toiſes, and take on the counterſcarp of the great ditch 15 toiſes from the re-entering angle *p* to *q*, and draw N*q*; then *q*NM*p* will be the tenailles required; its ditch is 12 toiſes, that is, the ſame as that of the ravelin. Sometimes there is made a retired battery in the front of the tenaillons, as in B; this battery is 10 toiſes from the front to which it is parallel, and 15 toiſes long.

There are commonly retrenchments made in the tenaillons, ſuch as O; their parapets are parallel to the fronts MN, and biſect the ſide *q*N; the ditch before this retrenchment is 3 toiſes: and there is a banquette before the parapet next to the ditch of about 8 feet, called *berm*; which ſerves to prevent the earth of the parapet (which ſeldom has any revetment) from falling into the ditch.

It is to be obſerved, that the ravelin, before which tenaillons are conſtructed, muſt have its ſaliant angle much greater than the former conſtruction makes them; otherwiſe the ſaliant angles of the tenaillons become too acute; for which reaſon we made the capital of this

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Of Counterguards, &c.

this ravelin 45 toises, and the faces terminate within 3 toises of the shoulders.

6. *Construction of Counterguards.*

Plate CXCVII.

Fig. 10, 11. When the counterguard is placed before the ravelin, set off 40 toises on the capital of the ravelin from the saliant angle A to the saliant angle B, of the counterguard; and 10 from C to D, on the counterscarp of the ditch.

When the counterguard is before the bastion, such as in fig. 2. its saliant angle F is 50 toises from the saliant angle E of the bastion, and the breadth near the ditch of the ravelin 10 toises as before.

The ditch before the counterguards is 12 toises, and its counterscarp parallel to the faces.

Counterguards are made before the ravelin on some particular occasions only; but are frequently constructed before the bastions, as covering the flanks wonderfully well. Some authors, as Mr Blondel and Mr Coehorn, will have them much narrower than they are here.

7. *Construction of Hornworks.*

Fig. 12. Produce the capital of the ravelin beyond the saliant angle A, at a distance AB of about 80 toises; draw DBE at right angles to AB; in which take BD, BE, each equal to 55 toises; and on the exterior side DE, trace a front of a polygon in the same manner as that of the body of the place, making the perpendicular BF 10 toises, and the faces 30.

The branches D *a*, E *b*, of the hornwork, when produced, terminate on the faces of the bastions, within 5 toises of the shoulders. The ditch of the hornwork is 12 toises, and its counterscarp parallel to the branches; and in the front terminates at the shoulders, in the same manner as the great ditch before the bastions.

The capital of the ravelin before the front of the hornwork is 35 toises, and the faces terminate on the shoulders, or rather 2 or 3 toises beyond them: and the ditch before the ravelin is 8 toises.

There are sometimes retrenchments made within the hornwork, such as S, S; which are constructed by erecting perpendiculars to the faces of the ravelins, within 25 toises of their extremities. This retrenchment, like all others, has a parapet turfed only with a berm of 8 feet before it; as likewise a ditch from 3 to 5 toises broad.

Fig. 13. When a hornwork is made before the bastion, the distance DL of the front from the saliant angle of the bastion is 100 toises, and the branches terminate on the faces of the adjacent ravelins within 5 toises from their extremities; all the rest is the same as before.

8. *Construction of Crown-works.*

Plate CXCVIII.

From the saliant angle, A (fig. 1.) of the ravelin, as a centre, describe an arc of a circle with a radius of about 120 toises, cutting the capital of the ravelin produced at C; from the point C, set off the cords CB, CF, each of them equal to 110 toises; and on each of which, as an exterior side, construct a front of a polygon of the same dimensions as in the hornwork; that is, the perpendicular should be 18 toises, the faces 30, and the branches terminate on the faces of the bastions within 25 toises of the shoulders.

The ditch is 12 toises, the capital of the ravelin 35, and its ditch 8; that is, the same as in the hornwork.

Sometimes the crownwork is made before the bastion, as in fig. 2. The arc is described from the saliant angle A of the bastion, with a radius of 120 toises, as before; and the branches terminate on the faces of the adjacent ravelins within 25 toises of their extremities: the rest of the dimensions and constructions are the same as before.

Hornworks, as well as crownworks, are never made but when a large spot of ground falls beyond the fortification, which might be advantageous to an enemy in a siege, or to cover some gate or entrance into a town.

9. *Construction of Covert-ways and Glacis.*

Although we have hitherto mentioned the covert-way, nevertheless all fortifications whatsoever have one; for they are esteemed to be one of the most essential parts of a modern fortification; and it is certain, the taking the covert-way, when it is in a good condition and well defended, is generally the most bloody action of the siege.

After having constructed the body of the place, and all the outworks which are thought necessary, lines are drawn parallel to the outmost counterscarp of the ditches, at 6 toises distance from it; and the space *m n*, *m n*, included between that line and the counterscarp, will be the covert-way required.

Fig. 3. There is in every re-entering angle of the counterscarp a place of arms, *m*; which is found by setting off 20 toises from the re-entering angle *a*, on both sides from *a* to *b*, and from *a* to *c*; and from the points *b*, *c*, as centres, arcs are described with a radius of 25 toises, so as to intersect each other in *d*; then the lines drawn from this intersection to the points *b*, *c*, will be the faces of the places of arms.

If lines are drawn, parallel to the lines which terminate the covert way, and the places of arms, at 20 toises distant from them, the space *x*, *x*, *x*, between these lines and those which terminate the covert-way, will be the glacis.

At the extremities of the places of arms are traverses made, such as *v*, *v*, which serve to inclose them; these traverses are 3 toises thick, and as long as the covert-way is broad; and a passage is cut in the glacis round them, of about 6 or 8 feet, in order to have a free communication with the rest of the covert-way.

There are also traverses of the same dimensions before every saliant angle of the bastion and outworks, and are in the same direction as the faces of those works produced; and the thickness lies at the same side as the parapet.

The passages round these last traverses are likewise from 6 to 8 feet wide.

In each place of arms are two sally ports *x z*, which are 10 or 12 feet wide, for the troops to sally out; in time of a siege they are shut up, with barriers or gates.

10. *Construction of Arrows and Detached Redoubts.*

An arrow is a work made before the saliant angles of the glacis, such as A, fig. 3. It is composed of a

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Fig. 1.

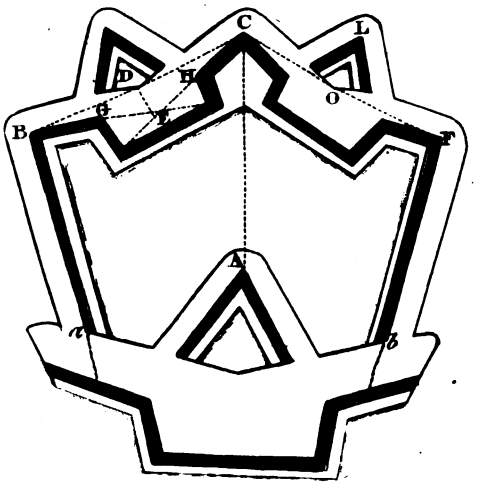


Fig. 3.

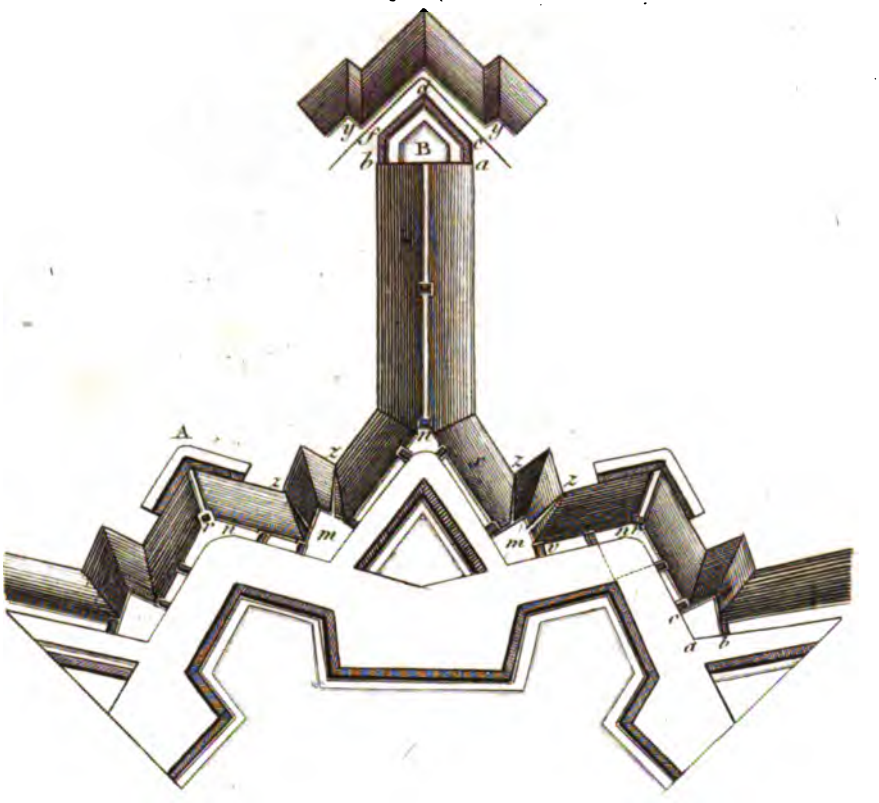


Fig. 2.

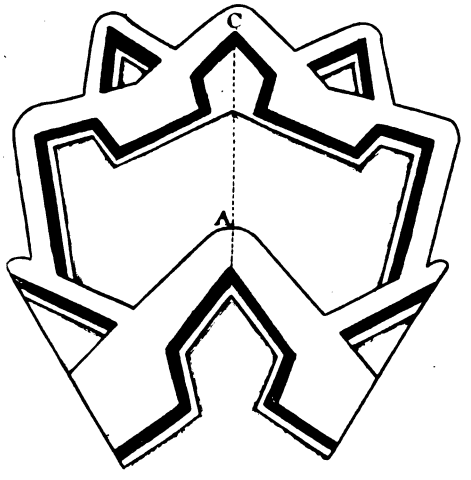
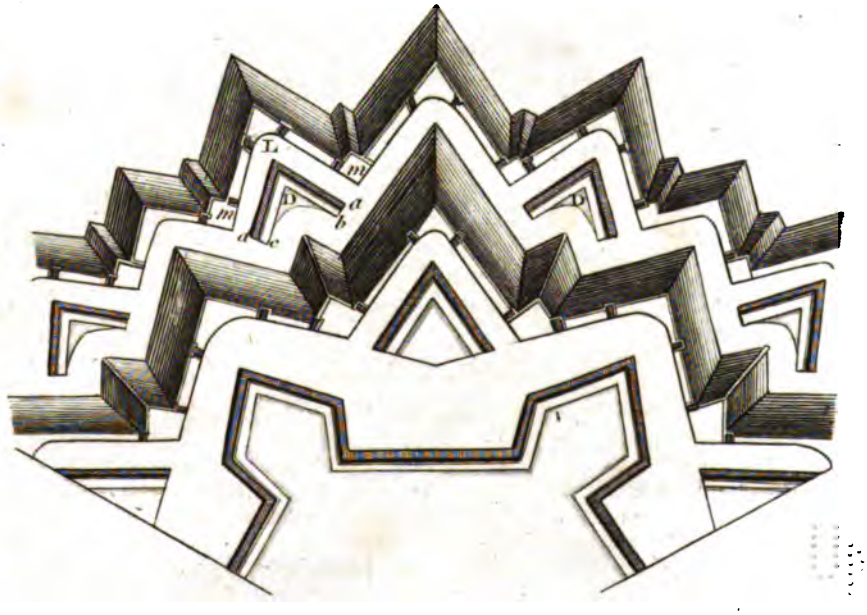


Fig. 4.



A. Bell Prin. Wal. Sculptor, fecit.

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Of Covert-ways, &c. Plate CVIII.

parapet of 3 toiſes thick, and 40 long; and the ditch before it 5 toiſes, terminating in a ſlope at both ends. The communication from the covert way into theſe arrows is 4 or 5 toiſes wide; and there is a traverſe, *r*, at the entrance, of 3 toiſes thick, with a paſſage of 6 or 8 feet round it.

A detached redoubt is a kind of work much like a ravelin, with flanks placed beyond the glacis; ſuch as B: they are made in order to occupy ſome ſpot of ground which might be advantageous to the beſiegers; likewiſe to oblige the enemy to open their trenches farther off than they would do otherwiſe.

Their diſtance from the covert-way ought not to exceed 120 toiſes, that it may be defended by muſket-ſhot from thence.

The gorge *a b* is 40 toiſes; the flanks *a c*, *b f*, which are perpendicular to the gorge, 10; and the faces *c d*, *f d*, 30: the ditch before it is 6 toiſes, ending in ſlopes at both ends; the covert-way 4; the branches of the covert-way are 42 toiſes long, or thereabouts; the faces of the places of arms *y*, *y*, which are perpendicular to the branches, 10; and the other, which is parallel to them, 14.

The communication from the covert-way into the redoubt, is 5 or 6 toiſes wide; and there is a traverſe made juſt at the entrance, and another in the middle when it is pretty long. The parapets of this communication terminate in a ſlope or glacis.

If theſe redoubts are above 50 toiſes diſtant from the covert-way, the beſiegers carry their trenches round, and enter through the gorge; by which the troops that are in them are made priſoners of war, if they do not retire betimes; to prevent which, ſome other outworks ſhould be made to ſupport them.

11. *Conſtruction of Second Ditches and Covert-ways.*

Fig. 4. When the ground is low, and water to be found, there is often a ditch about 10 or 12 toiſes made round the glacis; and oppoſite to the places of arms are conſtructed lunettes, beyond the ditch: ſuch as D, whoſe breadth on the counterſcarp of the ditch is 10 toiſes, from *b* to *a*, and from *c* to *d*; and the faces *a* L, *d* L, are parallel to thoſe of the places of arms; the ditch before them is from 8 to 10 toiſes wide.

The ſecond covert-way is 4 toiſes, the ſemi-gorges of the places of arms, *m*, about 15, and the faces perpendicular to the counterſcarp; the ſecond glacis is from 15 to 18 toiſes broad.

This ſecond covert-way has traverſes every where, in the ſame manner as the firſt.

12. *Conſtruction of Profiles.*

A PROFILE is the repreſentation of a vertical ſection of a work; it ſerves to ſhow thoſe dimenſions which cannot be repreſented in plans, and is neceſſary in the building of a fortification. Profiles are generally conſtructed upon a ſcale of 30 feet to an inch. It would be endleſs to deſcribe all their particular dimenſions; we ſhall therefore lay down the principal rules only, given by M. Vauban, on this ſubject.

1. Every work ought to be at leaſt 6 feet higher than that before it, ſo that it may command thoſe before it; that is, that the garriſon may fire from all the works at the ſame time, with great and ſmall arms, at the beſiegers in their approaches. Notwithſtanding this ſpecious pretence, there are ſeveral authors who object againſt it. For, ſay they, if you can diſcover the enemy from all the works, they can diſcover, by the ſame reaſon, all the works from their batteries; ſo that they may deſtroy them without being obliged to change their ſituation, and thereby diſmount all the guns of the place before they come near it.

Of Profiles. Plate CXCVIII.

But if all the works were of the ſame height, thoſe within cannot be deſtroyed, till ſuch time as thoſe before them are taken: guns might be placed in the covert-way and outworks to obſtruct the enemy's approach; and when they come near the place, they might be tranſported into the inner-works: and as the body of the place would be much lower, the expence would be conſiderably diminiſhed.

But when works are low, they are eaſily enfiladed by the ricochet batteries, which is a kind of firing with a ſmall quantity of powder, by giving the gun an elevation of 10 or 12 degrees: this might however be partly prevented, by making the parapets near the ſaliant angles, for the ſpace of 8 toiſes on each ſide, 5 or 6 feet higher than the reſt of the works.

2. The covert-way ſhould be lower than the level-ground, otherwiſe the body of the place muſt be raiſed very high, eſpecially where there are ſeveral outworks: this is to be underſtood only when the works exceed each other in height, otherwiſe it need not be below the level.

3. The baſes of all inward ſlopes of earth ſhould be at leaſt equal to the height, if not more.

4. The baſes of all outward ſlopes of earth, two-thirds of their heights.

5. The ſlopes of all walls or revetments ſhould be one-fifth of their height; or one-ſixth might perhaps be ſufficient: the height of a wall is eſtimated from the bottom of the ditch, and not from the beginning of its foundation.

6. The ſlopes of all parapets and traverſes are one-ſixth of their breadth; that is, 3 feet towards the field; or the inſide, where the banquettes ſhould be 3 feet higher than the outſide.

7. When the revetment of a rampart goes quite up to the top, 4 feet of the upper part is a vertical wall of 3 feet thick, with a ſquare ſtone at the top of it projecting 6 inches; and a circular one below, or where the ſlope begins, of 8 or 10 inches diameter: they go quite round the rampart, and the circular projection is called the *cordon*.

Where the ſtraight part of the wall ends and the ſlope begins, the wall is always made 5 feet thick; and the counterforts or buttreſſes reach no higher than that place.

8. When the rampart is partly walled and partly turfed, then one-fifth of the height which is turfed muſt be added to 5 feet, to get the thickneſs of the wall above.

And having the thickneſs of any wall above, by adding one-fifth of its height from the bottom of the ditch, the ſum will be the thickneſs of the wall at the bottom; but if a ſixth part is only taken for the ſlope, then a ſixth part muſt be added.

For inſtance, ſuppoſe a rampart of 30 feet high from the bottom of the ditch, and that 10 of which are to be turfed; then the fifth part of 10, which is 2, added

to

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Of Irregular Fortification.

to 5, gives 7 for the wall above; and as this wall is 20 feet high, the fifth of which is 4, and 4 added to the thickneſs 7 above, gives 11 for the thickneſs near the foundation.

Plate CXCIX.

Fig. 1. Repreſents, in military perſpective, the profiles of the body of a place, the ravelin and covert-way; which gives a clear idea of what is meant by a profile, and from which thoſe of all other works may be eaſily conceived.

Sect. II. *Of Irregular Fortification.*

The moſt eſſential principle in fortification conſiſts in making all the fronts of a place equally ſtrong, ſo that the enemy may find no advantage in attacking either of the ſides. This can happen no otherwiſe in a regular fortification ſituated in a plain or even ground: but as there are but few places which are not irregular either in their works or ſituations, and the nature of the ground may be ſuch as makes it impracticable to build them regular without too great expence; it is ſo much the more neceſſary to ſhow in what conſiſts the ſtrength or weakneſs of a town irregularly fortified, ſo that the weakeſt part may be made ſtronger by additional outworks; as likewiſe, if ſuch a place is to be attacked, to know which is the ſtrongeſt or weakeſt part.

1. *Conſtruction of an irregular place ſituated in an open country.*

If the place to be fortified is an old town incloſed by a wall or rampart, as it moſt frequently happens, the engineer is to conſider well all the different circumſtances of the figure, ſituation, and nature of the ground; and to regulate his plan accordingly, ſo as to avoid the diſadvantages, and gain all the advantages poſſible: he ſhould examine, whether by cutting off ſome parts of the old wall or rampart, and taking in ſome ground, the place can be reduced into a regular figure, or nearly ſo; for if that can be done without increaſing the expence conſiderably, it ſhould by no means be omitted. Old towns have often towers placed from diſtance to diſtance, as Douay, Tournay, and many other places, which are generally made uſe of, and mended when it may be done. If there is a rampart without baſtions or towers, it muſt be well conſidered whether baſtions may not be added, or if it is not better to make only ſome outworks: if the ditch about this rampart is not too wide and deep, it would be advantageous to make detached baſtions; otherwiſe ravelins and counterguards muſt be conſtructed. Special care muſt be taken to make all the ſides of the polygon as nearly equal as poſſible, and that the length of the lines of defence do not exceed the reach of muſket-ſhot; but if that cannot be done, thoſe ſides which are on the narroweſt part ſhould be made the longeſt.

If it ſhould happen that ſome of the ſides are inacceſſible or of very difficult approach, either on account of ſome precipice, marſhy ground, or inundation, they may be made much longer than the others which are of eaſy acceſs, and the flanks need not be ſo large as the reſt; by doing ſo, there will be ſome expences ſaved, which may be uſed in making the other ſides ſtronger by adding more outworks.

There are few ſituations but what are more advantageous in ſome parts than in others; it is therefore the buſineſs of an engineer to diſtinguiſh them, and to render thoſe ſides ſtrong by art which are not ſo by nature.

Of Irregular Fortification.

Plate CXCIX.

If the ſituation is low and watery, lunettes or tenallons, and ſuch other ſmall outworks, ſhould be conſtructed; becauſe they are not of any great expence, and may make a very good defence. But if one ſide of the place only is low, and running water is to be had, a ſecond ditch and covert-way with lunettes may be made, by obſerving, that if the firſt glacis is made to ſlope, ſo as to become even with the level of the water in the ſecond ditch; or if the water can be ſwelled by means of dykes or ſluices, ſo as to overflow the beſt part of the firſt glacis, it ſhould be done: for by ſo doing theſe works will be able to make a very good defence, ſince the beſiegers will find it a difficult matter to lodge themſelves upon this glacis; which cannot be done but within a few toiſes of the firſt covert-way, where the beſieged are ready to receive them, and to deſtroy their works with great advantage; whereas the enemy cannot ſupport their workmen but from the ſecond covert-way, which is too far off to be of any great ſervice to them.

But if the ſituation is of a dry nature, without any water about it, caponiers ſhould be made in the great ditch, from the curtains to the ravelin, and batteries raiſed in the entrance of the ditch before the ravelin, whoſe parapet muſt ſlope off into a glacis ſo as to afford no cover for the enemy behind them. Arrows and detached redoubts are likewiſe very proper to be uſed in ſuch a caſe; and ſometimes horn or crown works, if it ſhould be thought convenient: but theſe works ſhould never be conſtructed without an abſolute neceſſity, either to occupy a ſpot of ground which might be advantageous to the enemy, or to cover ſome gate or entrance into the town; for they are of great expence, and their defence ſeems not to be anſwerable to it.

Moſt of the places in Flanders are fortified with horn-works, ſuch as Ipres, Tournay, Lille, and others.

If the place to be fortified is new, and the ſituation will not admit of a regular conſtruction, particular care muſt be taken in chooſing ſuch a ſpot of ground as is moſt advantageous, and leaſt liable to any diſadvantages either in the building or in the maintaining of it. All hills or riſing grounds ſhould be avoided, which might command any part of the works; marſhy grounds, becauſe ſuch ſituations are unwholeſome; or lakes and ſtanding waters for the ſame reaſon, excepting a lake is or may be made navigable. Good water ſhould be had either within the place or near it, for it is abſolutely neceſſary for men and cattle; the air ſhould be wholeſome; otherwiſe the continual ſickneſs that may reign in ſuch a place might prevent people to come and live in it, and the garriſon would not be in a condition to defend themſelves as they ought to do. In ſhort, all the different circumſtances attending ſuch an undertaking ſhould be maturely conſidered before a reſolution is taken to fortify any place.

When a ſituation is fixed upon, the next thing to be conſidered is, the bigneſs of the town and the number of its outworks; which muſt abſolutely depend upon the conſequence ſuch a place is of to a nation. If it is only to guard a paſs or entrance into a country, it need not be ſo large: but if it is to be a place either to promote

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Fig. 1.

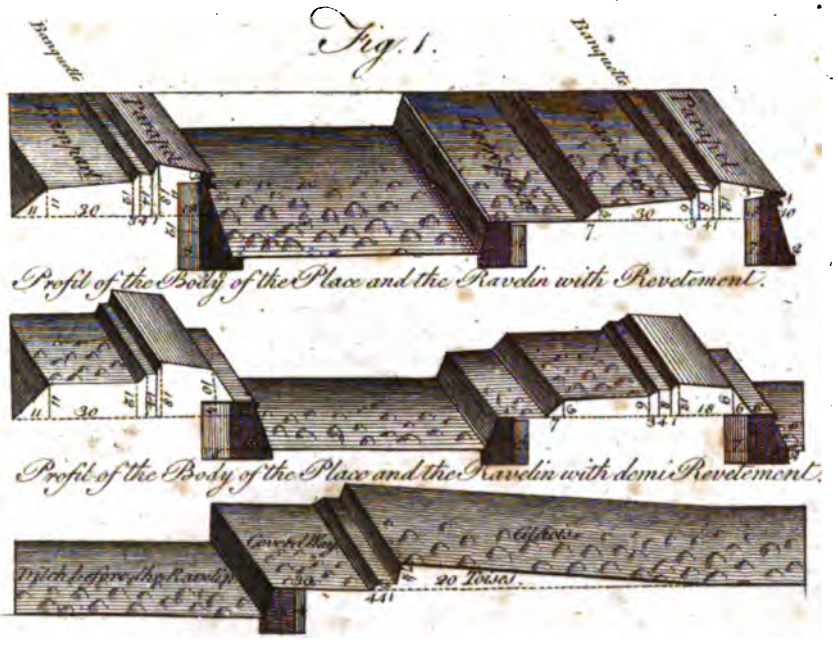


Fig. 2.

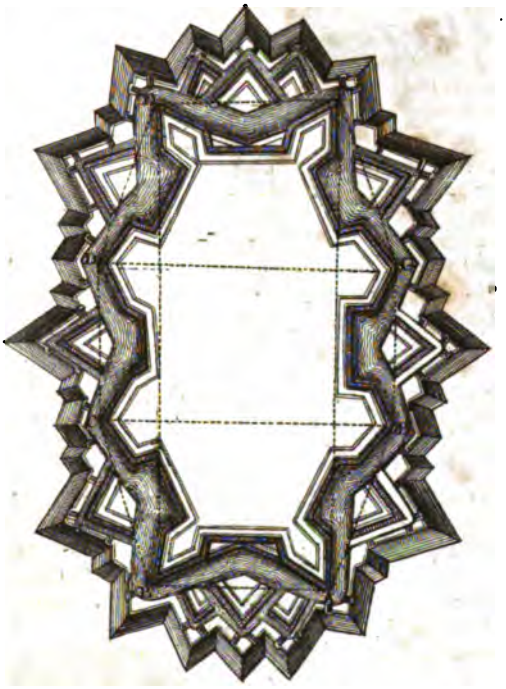
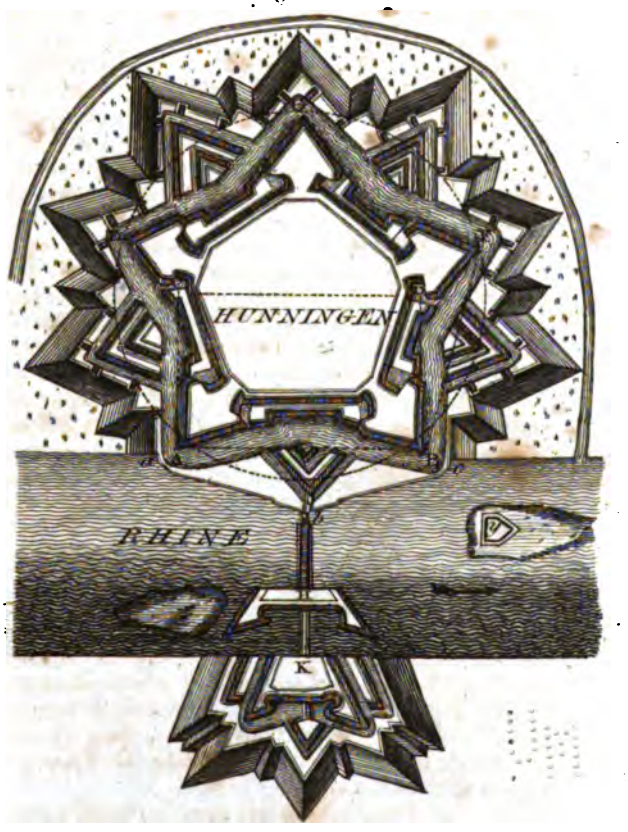


Fig. 3.



A. Bell Prin. Mak. sculptor fecit.

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Of Irregular Fortification.

Plate CXCIX.

promote or to protect trade, it ſhould be large and commodious; the ſtreets ſhould be wide, and the buildings regular and convenient. As to what regards the fortification, its conſtruction ſhould depend on the nature of the ſituation, and the number of works, on the funds or expence a prince or a nation will be at; which, however, ought to be according to the benefit ariſing from ſuch a place: for as ſuch undertakings are of very great expence, an engineer cannot be too ſparing in his works; on the contrary, the greateſt economy ſhould be uſed both in regard to the number of works and to their conſtruction. The body of the place may have (A) revetments quite up to the top, or only in part, and the reſt turfed; but as to the outworks, they ſhould have half revetments, or they may be made with turf only; as being not ſo neceſſary to prevent the place from being ſurpriſed, which may nevertheleſs make a good defence.

Fig. 2. is the plan of an octagon, one half of which is ſimilar and equal to the other half; it being ſuppoſed, that the ſituation would not admit of fortification quite regular. The exterior ſides are each 180 toiſes, and the works are conſtructed according to our method: but becauſe the ſides AB, EF, are weaker than the reſt, as has been proved before, we have added tenailles, redoubts in the ravelins, and lunettes, to render them nearly equal in ſtrength with the others; and if counter-guards were made before the baſtions A and B, it would effectually ſecure that front. Inſtead of lunettes, any other works may be made, as may be thought convenient and according to the nature of the ground. If it ſhould be judged neceſſary to add other outworks to the ravelins all round the place, care muſt be taken to add likewiſe more to the fronts AB, EF, in order to render the advantages and diſadvantages of attacking on either ſide equal.

2. *Conſtruction of an irregular place ſituated on a hill or rock.*

In the conſtruction of ſuch places, care muſt be taken that no neighbouring hill commands any part of the works. The town ſhould always be built on the higheſt part; but if it ſhould be thought more convenient to place it lower, then the upper part muſt be fortified with a fort. The ſituation ſhould be made level as near as poſſible, by removing the earth from ſome places to fill up others; and if it cannot well be levelled without extraordinary expence, works muſt be made on the higheſt part, ſo as to command and protect the lower. The works ought to occupy all the upper part of the hill; but if it ſhould be too extenſive to be all incloſed, or ſo irregular as not to be fortified without great inconvenience, the parts which fall without ſhould be fortified with ſome detached works, and a communication with the place muſt be made either above or under ground. There ſhould be no cavity or hollow roads within cannon-ſhot round about the place, where the enemy might be able to approach under cover. If there ſhould happen to be a ſpring near the top of the hill, it ſhould be incloſed in the fortification; or if that cannot be done, by ſome work or other: for there is nothing more neceſſary, and at the ſame time ſcarcer, in ſuch ſituations, than water; for which reaſon there cannot be too much care in providing it: ſeveral ciſterns are to be made to receive the rain-water, and to preſerve it; wells ſhould be dug likewiſe, though ever ſo deep, the water of which will ſerve for common uſe.

Of Irregular Fortification.

Plate CXCIX.

Places built on hills or rocks ſhould never be large; for their uſe is generally to guard paſſes or inlets into a country, and are ſeldom uſeful in traffic; and it is a difficult matter to provide for a large garriſon in ſuch ſituations, neither ſhould any ſuch place be built without ſome very material reaſons: but when it is abſolutely neceſſary, great care and precaution ſhould be taken to render the works as perfect as the ſituation will admit of, and at the ſame time to be as frugal in the expence as poſſible.

3. *Conſtruction of irregular fortifications ſituated near rivers, lakes, or the ſea.*

As the intent of building theſe kind of places is chiefly to facilitate and protect trade, they are of more importance than any other kind, eſpecially in maritime countries, where the principal ſtrength and power depends on them: for which reaſon, we ſhall treat of this conſtruction more largely than of any other.

The firſt thing to be conſidered is their ſituation, which ought to be ſuch as to afford a good harbour for ſhipping, or a ſafe and eaſy entrance in ſtormy weather; but as it is hardly poſſible to find any where ſhips may go in and lie ſecure with all winds, care ſhould be taken to make them ſafe to enter with thoſe winds which are moſt dangerous: but it is not ſufficient that the harbour is ſafe againſt ſtormy weather, they ſhould likewiſe be ſo againſt an enemy both by land and water; for it often happens, that ſhips are deſtroyed where it was imagined they were ſecure, which is of too great conſequence not to be provided againſt; for which reaſon, forts or batteries muſt be built in the moſt convenient places, to prevent the enemy's ſhips from coming too near ſo as to be able to cannonade thoſe in the harbour, or fling ſhells amongſt them; and if there is any danger of an enemy's approach by land, high ramparts and edifices muſt be built, ſo as to cover them.

When a river is pretty large, and it is not convenient for making a harbour without great expence, the ſhips may ride along the ſhore; which, for that reaſon, muſt be made acceſſible for ſhips of burden: this may be done by advancing the quay into the river if the water is too ſhallow, or by digging the river ſufficiently deep for that purpoſe.

And to prevent an enemy from coming up the river, forts muſt be built on both ſides, eſpecially when there are any turnings or windings. Antwerp is ſuch a place: for the Scheld is ſufficiently deep to carry ſhips of great burden, which may come quite near the town-wall; and ſeveral forts are built below it on both ſides, ſo that it would not be an eaſy matter for an enemy to come up the river.

When the river is but ſmall, ſo that no ſhips of bur-

(A) Revetments are chiefly made to prevent a place from being ſurpriſed: outworks do not want to be made ſo; the taking them by ſurpriſe is of no great conſequence, except in a ſiege, when other cautions are uſed to prevent it.

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Of Irregular Fortification.

Plate CXCIX.

den can come through it, it is ſufficient to make it run through ſome of the works, where proper landing-places are contrived, from whence the goods may be carried in to the place; as at Sarrelouis, where a hornwork is built beyond the Sarre, in the gorge of which the goods are landed.

If the breadth of the river does not exceed 200 yards, it commonly paſſes through the middle of the town, and proper quays are made on each ſide; in ſuch a caſe, the fortification is ſo contrived, as that the river paſſes through the curtain, in order to have a baſtion on each ſide to defend the coming in and going out.

When M. Vauban fortified near rivers, he made always the exterior ſide near the water much longer than any of the others; ſuch as Hunninghen on the Rhine, and Sarrelouis on the Sarre; but for what reaſon he fortified theſe places in that manner, has not been told by any author.

But it is plain that the ſides which terminate at the river are the weakeſt; becauſe the beſiegers trenches being ſecured by the river, they may draw moſt of their troops off, and act therefore with more vigour and ſtrength on the other ſide: beſides, as the ſtrength of a ſide increaſes in proportion as the angle of the polygon is greater, by making the ſide next the river longer, the angles at its extremities become wider, and conſequently the adjacent ſides ſtronger.

There are other advantages, beſides thoſe mentioned already, which ariſe from the lengthening that ſide: for if the river is pretty deep ſo as not to be fordable, that ſide is not liable to be attacked; and by increaſing its length, the capacity of the place increaſes much more in proportion to the expence, than if more ſides were made; the centre of the place will be likewiſe nearer the river, which makes it more convenient for tranſporting the goods from the water-ſide to any part of the town.

Fig. 3. To illuſtrate this method of M. Vauban's, we ſhall give the plan of Hunninghen: this place was built for the ſake of having a bridge over the Rhine, for which reaſon he made it only a pentagon; the ſide AB next to the river is 200 toiſes, and each of the others but 180.

Of Irregular Fortification.

Plate CXCIX.

About the ſpace *abc*, which lies before the front AB, is a ſtone wall; and the paſſages *x x* are ſhut up with ſluices, to retain the water in the ditches in dry ſeaſons: and to prevent an enemy from deſtroying the ſluice near the point *c*, whereby the water would run out and leave the ditches dry, the redoubt *y* was built in the little iſland hard by, in order to cover that ſluice; without which precaution the place might be inſulted from the river ſide, where the water is ſhallow in dry ſeaſons.

The hornwork K beyond the Rhine was built to cover the bridge; but as this work cannot be well defended croſs the river, the hornwork H was made to ſupport the other.

Before finiſhing the deſcription of this plan, we ſhall ſhow how to find the long ſide AB.

After having inſcribed the two ſides GE, GF, in a circle, draw the diameter CD, ſo as to be equally diſtant from the line joining the points E F that is parallel to it. On this diameter ſet off 100 toiſes on each ſide of the centre; from theſe points draw two indefinite perpendiculars to the diameter; then if from the points E F, as centres, two arcs are deſcribed with a radius of 180 toiſes, their interſections A and B, with the ſaid perpendiculars, will determine the long ſide AB, as likewiſe the other two FB and EA. In like manner may be found the long or ſhort ſide of any polygon whatſoever.

When a place near a river is to be fortified for the ſafety of commerce, particular care ſhould be taken in leaving a good ſpace between the houſes and the water-ſide, to have a key or landing place for goods brought by water; it ſhould alſo be contrived to have proper places for ſhips and boats to lie ſecure in ſtormy weather, and in time of a ſiege; and as water-carriage is very advantageous for tranſporting goods from one place to another, as likewiſe for bringing the neceſſary materials, not only for building the fortifications, but alſo the place itſelf, the expences will be leſſened conſiderably when this convenience can be had; for which reaſon, places ſhould never be built any where elſe but near rivers, lakes, or the ſea; excepting in extraordinary caſes, where it cannot be avoided.

F O R

Fortin || Fortitude.

FORTIN, FORTELET, or *Field-fort*, a ſconce or little fort; whoſe flanked angles are generally 120 fathoms diſtant from one another.

The extent and figure of fortins are different, according to the ſituation and nature of the ground; ſome of them having whole baſtions, and others demi-baſtions. They are made uſe of only for a time, either to defend the lines of circumvallation, or to guard ſome paſſage or dangerous poſt.

FORTISSIMO, in muſic, ſometimes denoted by FFF, or *fff*, ſignifies, to ſing or play very loud or ſtrong.

FORTITUDE, a virtue or quality of the mind, generally conſidered as the ſame with COURAGE; tho' in a more accurate ſenſe they ſeem to be diſtinguiſhable. Courage may be a virtue or a vice, according to circumſtances; *fortitude* is always a virtue: we ſpeak

F O R

of deſperate courage, but not of deſperate fortitude. A contempt or neglect of danger, without regard to conſequences, may be called *courage*; and this ſome brutes have as well as we: in them it is the effect of natural inſtinct chiefly; in man it depends partly on habit, partly on ſtrength of nerves, and partly on want of conſideration. But fortitude is the virtue of a rational and conſiderate mind, and is founded in a ſenſe of honour and a regard to duty. There may be courage in fighting a duel, though that folly is more frequently the effect of cowardice: there may be courage in an act of piracy or robbery; but there can be no fortitude in perpetrating a crime. Fortitude implies a love of equity and of public good; for, as Plato and Cicero obſerve, courage exerted for a ſelfiſh purpoſe, or without a regard to juſtice, ought to be called audacity rather than fortitude.

Fortitude.

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Fortitude, Fortuna.

This virtue takes different names, according as it acts in oppoſition to different ſorts of evil; but ſome of thoſe names are applied with conſiderable latitude. With reſpect to danger in general, fortitude may be termed *intrepidity*; with reſpect to the dangers of war, *valour*; with reſpect to pain of body or diſtreſs of mind, *patience*; with reſpect to labour, *activity*; with reſpect to injury, *forbearance*; with reſpect to our condition in general, *magnanimity*.

Fortitude is very becoming in both ſexes; but courage is not ſo ſuitable to the female character: for in women, on ordinary occaſions of danger, a certain degree of timidity is not unſeemly, becauſe it betokens gentleneſs of diſpoſition. Yet from thoſe of very high rank, from a queen or an empreſs, courage in emergencies of great public danger would be expected, and the want of it blamed; we ſhould overlook the ſex, and conſider the duties of the ſtation. In general, however, maſculine boldneſs in a woman is diſagreeable; the term *virago* conveys an offenſive idea. The female warriors of antiquity, whether real or fabulous, Camilla, Thaleſtris, and the whole community of AMAZONS, were unamiable perſonages. But female courage exerted in defence of a child, a huſband, or a near relation, would be true fortitude, and deſerve the higheſt encomiums.

The motives to fortitude are many and powerful. This virtue tends greatly to the happineſs of the individual, by giving compoſure and preſence of mind, and keeping the other paſſions in due ſubordination. To public good it is eſſential; for without it, the independence and liberty of nations would be impoſſible. It gives to a character that elevation which poets, orators, and hiſtorians, have in all ages vied with one another to celebrate. Nothing ſo effectually inſpires it as rational piety; the fear of God is the beſt ſecurity againſt every other fear. A true eſtimate of human life; its ſhortneſs and uncertainty; the numberleſs evils and temptations to which by a long continuance in this world we muſt unavoidably be expoſed; ought by no means to diſcourage or to throw any gloom on our future proſpects: they ſhould teach us, that many things are more formidable than death; and that nothing is loſt, but much gained, when, by the appointment of Providence, a well-ſpent life is brought to a concluſion.

Let it be conſidered too, that puſillanimity and fearfulneſs can never avail us any thing. On the contrary, they debaſe our nature, poiſon all our comforts, and make us deſpicable in the eyes of others; they darken our reaſon, diſconcert our ſchemes, enfeeble our efforts, extinguiſh our hopes, and add tenfold poignancy to all the evils of life. In battle, the brave ſoldier is in leſs danger than the coward; in leſs danger even of death and wounds, becauſe better prepared to defend himſelf; in far leſs danger of infelicity; and has before him the animating hope of victory and honour. So in life, the man of true fortitude is in leſs danger of diſappointment than others are, becauſe his underſtanding is clear, and his mind diſencumbered; he is prepared to meet calamity without the fear of ſinking under it; and he has before him the near proſpect of another life, in which they who piouſly bear the evils of this will obtain a glorious reward.

FORTUNA, a goddeſs worſhipped with great devotion by the ancient Greeks and Romans; who believed her to preſide over human affairs, and to diſtribute wealth and honour at her pleaſure. See FORTUNE.

Fortunate, Fortune.

FORTUNATE-ISLANDS, in ancient geography, certain iſlands (concerning the ſituation of which authors are not agreed) famous for the golden apples of the HESPERIDES.—The common opinion is, that they are the *CANARY Iſlands*.

FORTUNE (Τυχη), a name which among the ancients ſeems to have denoted a principle of fortuity, whereby things came to paſs, without being neceſſitated thereto: but what and whence that principle is, they do not ſeem to have ever preciſely thought. Hence their philoſophers are often intimating, that men only framed the phantom *Fortune* to hide their ignorance; and that they call *Fortune* whatever befals a man without his knowing for what purpoſe. Hence Juvenal (ſat. x. ver. 366.) affirms, they were men who made a deity of Fortune.

Nullum numen abeſt, ſi ſit prudentia; ſed te
Nos facimus, Fortuna, deam, cæloque locamus.

The ingenious Mr Spence gives another reading of this paſſage:

Nullum numen habes, ſi ſit prudentia; ſed te
Nos facimus, Fortuna, deam cæloque locamus.

This reading, he thinks, agrees beſt with the context: Juvenal ſays, ver. 356. that the two things we ſhould pray for are good health and good ſenſe; that we might be the authors of our own happineſs if we pleaſed, ver 363; that virtue is the only way to true happineſs, ver. 364; that if we ourſelves are prudent, Fortune has no power over us; and that, in truth, ſhe is no goddeſs at all, and has only uſurped a ſeat in heaven from the folly of mankind, ver. 366. Fortune was not conſidered as a deity by the old Romans, but was made ſo by the devotion and folly of the vulgar; and Mr Spence ſays, that he has ſeen an ancient gem, in which Cybele, the mother of the gods, is repreſented as turning away her head from Fortune, in an attitude of diſowning and rejecting her; (Polymetis, p. 150, 154. &c.)

According to the opinion of the heathens, therefore, fortune in reality was only the arrival of things in a ſudden and unexpected manner, without any apparent cauſe or reaſon: ſo that the philoſophical ſenſe of the word coincides with what is vulgarly called *chance*.

But in religion it had a farther force; altars and temples in great numbers were conſecrated to this Fortune, as a deity. This intimates, that the heathens had perſonified, and even deified, their chance; and conceived her as a ſort of goddeſs, who diſpoſed of the fate of men at her pleaſure. Hence that invocation of Horace, *O diva, gratum quæ regis Antium*, in the 35th ode of the firſt book, where he recommends Auguſtus, then preparing for a viſit to Britain, to her protection. From theſe different ſentiments it may be inferred, that the ancients at one time took Fortune for a peremptory cauſe, bent upon doing good to ſome, and perſecuting others; and ſometimes for a blind inconſtant cauſe, without any view or determination at all.

If then the word *fortune* had no certain idea in the mouth of thoſe who erected altars to her, much leſs can it be aſcertained what it denotes in the mind o

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Fortune || Forum.

those who now use the word in their writings. They who would substitute the name *Providence* in lieu of that of *Fortune*, cannot give any tolerable sense to half the phrases wherein the word occurs.

Horace paints the goddess, preceded by Necessity, holding nails and wedges in her hands, with a cramp-iron, and melted lead to fasten it; rarely accompanied with Fidelity, unless when she abandons a family; for in that case Fidelity never fails to depart with her, as well as friends.

She is disrespectfully spoken of by most of the Roman writers, and represented as blind, inconstant, unjust, and delighting in mischief, (*Ovid. ad Liv.* ver. 52. ver. 374. *Hor.* lib. i. od. 34. ver. 26. lib. iii. od. 29. ver. 51. *Statius*, Theb. xii. ver. 505.) However, they had a good as well as a bad Fortune, a constant and inconstant Fortune; the latter of which was represented with wings, and a wheel by her, (*Hor.* lib. iii. od. 29. ver. 56.) Juvenal alludes to a statue of Fortune, which exhibited her under a very good character, as the patroness of the poor infants that were exposed by their parents in the streets, (*Sat.* vi. ver. 605.)

The painters represent her in a woman's habit, with a bandage before her eyes, to show that she acts without discernment; and standing on a wheel, to express her instability. The Romans, says Lactantius, represented her with a cornucopia, and the helm of a ship, to show that she distributes riches, and directs the affairs of the world. In effect, it is with such characters that we see her represented on so many medals, with the inscriptions, FORTVNA AVG. FORTVNA REDVX. FORTVNÆ AVG. or REDVCIS, &c. Sometimes she is seen pointing at a globe before her feet, with a sceptre in one hand, and holding the cornucopia in the other.

The Romans had a virile as well as a muliebrian Fortune, for the objects of their adoration: the *Fortuna virilis* was honoured by the men, and the *Fortuna muliebris* by the women. They honoured Fortune also under a variety of other appellations.

The Romans derived the worship of Fortune from the Greeks, under the reign of Servius Tullius, who dedicated the first temple to her in the public market. Nero also built a temple to Fortune. The Fortune worshipped at Antium was probably of the most exalted character of any among the Romans; if we may judge by the account which Horace gives us of the great solemn processions that were made to her, (*Hor.* lib. i. od. 35. ver. 22.) But the most celebrated temple of Fortune was at Præneste. Statius speaks of several Fortunes there, and calls them the *Præneſtinæ sorores*, (Lib. i. Sylv. iii. ver. 80.)

Fortune-Tellers. Persons pretending to tell fortunes are to be punished with a year's imprisonment, and standing four times on the pillory. Stat. 9 Geo. II. c. 5.

FORTY-DAYS *Court*, the court of *attachment* or *woodmote*, held before the verderors of the forest once every forty days, to inquire concerning all offenders against vert and venison. See ATTACHMENT.

FORUM, in Roman antiquity, a public standing place within the city of Rome, where causes were judicially tried, and orations delivered to the people.

FORUM was also used for a place of traffic, answering to our market-place. These were generally called *fora venalia*; in contradistinction to the former, which were called *fora civilia*. Forum.

The *fora civilia* were public courts of justice, very magnificent in themselves, and surrounded with porticos and stately edifices; of these there were six very remarkable: 1. *Forum Romanum.* 2. *Julianum.* 3. *Augustum.* 4. *Palladium.* 5. *Forum Trajani.* 6. *Forum Salustii.* The *Forum Romanum* was the most noted, and is often called simply *Forum*, by way of eminence. Here was the pleading place called *Rostra*, the *Comitium*, the sanctuary of *Saturn*, temple of *Castor*, &c. See ROSTRA, COMITIUM, &c.

The *fora venalia*, or market-places, were very numerous. The chief of them were the *forum boarium* for oxen or beef; *suarium* for swine; *pistorium* for bread; *cupedinarium* for dainties; *olitorium* for garden stuff.

The Grecian Ἀγοραὶ exactly correspond with the Roman *fora*, being places where courts and markets were held. At Athens they had many *fora*, but the chief of them were the *old* and the *new*.

Forum Indicere, was the act of the prætor appointing the place in Rome where causes were to be tried. *Agere forum* denoted the bringing on causes out of Rome, in a Roman province (Cicero, Suetonius); the same with *agere conventum* (Florus).

The term *forum* added to a proper name, denoted some market town or borough; as,

Forum Allieni, a place mentioned only by Tacitus; and, from what he says of it, thought to be *Ferrara*, capital of the duchy of that name in Italy. E. Long. 12. 5. N. Lat. 44. 46.

Forum Appii (Cicero, Luke); a town of the Volsci, in Latium, on the Via Appia, a little beyond the Tres Tabernæ; set down in the Jerusalem Itinerary as situated near the river Nymphæus: now entirely extinct.

Forum Cornelii, a town of the Cisalpina, built by Sylla: Now *Imola*, a city in the Romania, and territory of the pope. E. Long. 12. 12. N. Lat. 44. 30.

Forum Domitii, a town of Gallia Narbonensis: probably built by Ahenobarbus Domitius, who commanded in those parts: Now *Frontignan*, or *Frontigniac*, in Languedoc, near the Mediterranean. E. Long. 3. 30. N. Lat. 43. 30.

Forum Fulvii, a town of Liguria, surnamed *Valentinum*; from which it is conjectured that it is now *Valenza*, in the duchy of Milan; which is confirmed by Peutinger's distances. E. Long. 9°. N. Lat 45°.

Forum Gallorum, a small town of the Cisalpina, on the Via Æmilia, eight miles from Mutina, beyond the river Scultenna. Here Antony defeated Pansa, and was in his turn defeated by Hirtius: Now *Castelfranco*, in the territory of Bologna.—Another *Forum Gallorum*, a town of the Vascones in the Hither Spain: Now *Gurrea*, a small town of Arragon.

Forum Julium. There are several towns of this name; as a *Forum Julium*, of Gallia Narbonensis; or *Forojulium*: Now *Frejus*, or *Frejules*, in Provence, at the mouth of the Argens. *Forum Julium Carnorum*, to the north of Aquileia, in the Transpadana: Now *Cividal di Friuli*, formerly *Cividal d'Austria*, in the territory of Venice.

Forum Jutuntorum, a town of the Insubres, in the Transpadana: Now *Crema*, capital of the Cremasco, in

5

PLANTS in STONE.

LEAVES.

CORALS.

Porpites.

Porus.

Tubularia.

Junci Lapidei.

Calamus Indicus.

Astroites.

Lithostrotion.

Myrctites.

Coral.

FISHES TEETH

Glossopetræ.

Platronitæ.

Buffonitæ.

Ichthyospondylia.

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A Bell Sculp.t

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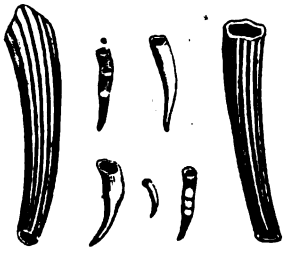
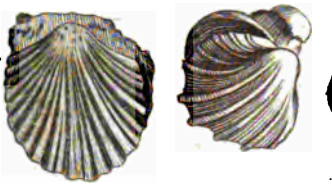
Dentalia.

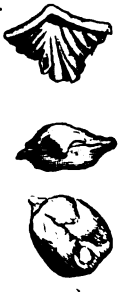


Pectines.



Tubulus Marinus

Concha.



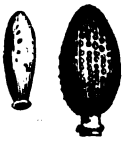
Concha Margaritifera?

Cylindri.

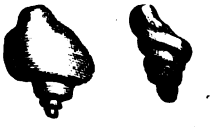
Syringoides Lapis.

Orthoceratites.

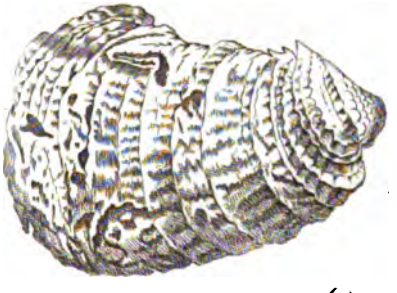
Judaicus Lapis.

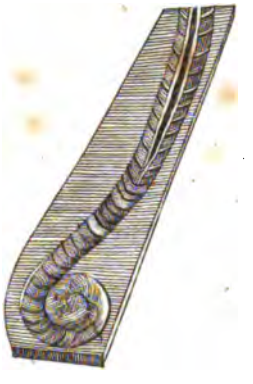


Cochlea.

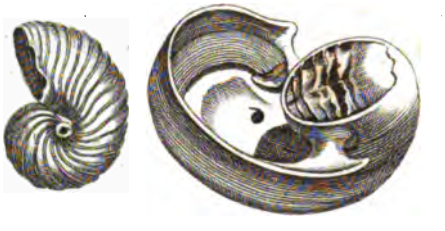


Ostracites.

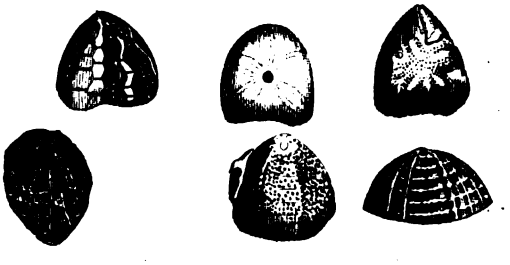




Nautili.



Echinita.



Nerita.

Trochi.

Ammonitæ or Snake Stones.

Buccina.

Gryphites.

Asteriæ or Star Stones.

Asteropodium.

Trochitæ.

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Forum Foſſe.

in the territory of Venice. E. Long. 10. 15. N. Lat. 45. 20.

Forum Livii, a town of the Semnones, in the Ciſpadana: Now *Forli*, in Romania. E. Long. 12. 45. N. Lat 44. 25.

Forum Segufianorum, ſituated on the eaſt ſide of the Liger, in Gallia Celtica: Now *Feurs*, on the Loire, in the Lionnois, capital of the territory of Forez. E. Long. 4. 15. N. Lat. 45. 44.

Forum Tiberii, a town of the Pagus Tigurinus, in Belgica, on the left or ſouth ſide of the Rhine: Now *Kayſerſtull*; literally the tribunal of Tiberius, which he held there when commander in the Rhetian war.

Forum Vulcani (Strabo); the *Campi Phlegraei* of Pliny: a place in Campania, encompaſſed with rocky eminences, near Puteoli, and diſtant from it two miles towards Naples, emitting ſmoke, and in ſome places flame, like a large extenſive furnace, and yielding ſulphur: Now called *Solfatara*, in the Terra di Lavoro.

FORUM, is alſo uſed, among caſuiſts, &c. for juriſdiction; thus they ſay, *In foro legis*, &c.

FOSS, or FOSSE, in fortification, &c. a ditch or moat. The word is French, formed of the Latin participle *foſſum*, of the verb *fodio* "I dig."

FOSS, *Foſſa*, in anatomy, a kind of cavity in a bone, with a large aperture, but no exit or perforation. When the aperture is very narrow, it is called a *ſinus*.

Foss is particularly uſed for the cavity or denture in the back part of the neck.

FOSSA MAGNA, or NAVICULARIS, is an oblong cavity, forming the inſide of the *pudendum muliebre*, and which preſents itſelf upon opening the labia; and in the middle whereof are the *caruncula myrtiformes*. See ANATOMY, p. 470.

FOSSA, in our ancient cuſtoms, was a ditch full of water, where women committing felony were drowned; as men were hanged: *Nam et ipſi in omnibus tenementis ſuis omnem ab antiquo legalem habuere juſtitiam, videlicet ferrum, foſſam, furcas, et ſimilia.* In another ſenſe it is taken for a grave, as appears by theſe old verſes:

Hic jacent in foſſa Bedæ venerabilis oſſa;
Hic eſt foſſatus, quibis erat bis cathedratus.

Foss-Way was anciently one of the four great Roman high-ways of England: ſo called, according to Cambden, becauſe it was ditched on both ſides, which was the Roman method of making highways.

FOSSARII, in antiquity, a kind of officers in the eaſtern church, whoſe buſineſs was to inter the dead.

Ciaconius relates, that Conſtantine created 950 foſſaries, whom he took out of the divers colleges or companies of tradeſmen: he adds, that they were exempted from taxes, ſervices, burdenſome offices, &c.

F. Goar, in his notes on the Greek Euchologion, inſinuates that the foſſarii were eſtabliſhed in the times of the apoſtles; and that the young men, who carried off the body of Ananias, and thoſe perſons full of the fear of God, who interred St Stephen, were of the number.

St Jerom aſſures us, that the rank of foſſarii held the firſt place among the clerks; but he is to be underſtood of thoſe clerks only who had the direction and intendance of the interment of the devout.

FOSSE, the Roman military-way in South Britain, begins at Totneſs, and paſſes through Exeter, Ivelcheſter, Shepton-Mallet, Bath, Cirenceſter, Leiceſter, the Vale of Belvoir, Newark, Lincoln, to Barton upon the Humber, being ſtill viſible in ſeveral parts, tho' of 1400 years ſtanding. It had the name from the foſſes or ditches made by the ſides of it. Foſſil.

FOSSIL, in natural hiſtory, denotes, in general, every thing dug out of the earth, whether they be natives thereof, as metals, ſtones, ſalts, earths, and other minerals; or extraneous, repoſited in the bowels of the earth by ſome extraordinary means, as earthquakes, the deluge, &c. See METAL, STONE, &c. Plates CC. & CCI.

Native foſſils, according to Dr Hill, are ſubſtances found either buried in the earth, or lying on its ſurface, of a plain ſimple ſtructure, and ſhowing no ſigns of containing veſſels or circulating juices. Theſe are ſubdivided by the ſame author, 1. Into foſſils naturally and eſſentially ſimple. Of theſe, ſome are neither inflammable nor ſoluble in water; as ſimple earths, talcs, fibrariæ, gypſum, ſelenitæ, cryſtal, and ſpars: others, though uninflammable, are ſoluble in water; as all the ſimple ſalts: and others, on the contrary, are inflammable, but not ſoluble in water; as ſulphur, auripigmentum, zarnich, amber, ambergreaſe, gagates, aſphaltum, ampelites, lithanthrax, naphtha, and piſſaſphalta. 2. The ſecond general ſubdiviſion of foſſils comprehends all ſuch as are naturally compound, but unmetallic. Of theſe, ſome are neither inflammable, nor ſoluble in water; as compound earths, ſtones, ſeptariæ, ſiderochita, ſemipellucid gems, &c. others are ſoluble in water, but not inflammable; as all the metallic ſalts: and, laſtly, ſome are inflammable, but not ſoluble in water; as the marcaſites, pyritæ, and phlogonia. 3. The third, and laſt, general diviſion of foſſils comprehends all the metallic ones; which are bodies naturally hard, remarkably heavy, and fuſible in fire. Of theſe, ſome are perfectly metallic, as being malleable when pure; ſuch are gold, lead, ſilver, copper, iron, and tin: others are imperfectly metallic, as not being malleable even in their pureſt ſtate; ſuch are antimony, biſmuth, cobalt, zinc, and quickſilver or mercury. Of all which ſubſtances, the reader will find a particular deſcription under their reſpective heads.

Extraneous foſſils are bodies of the vegetable or animal kingdoms accidentally buried in the earth. Of the vegetable kingdom, there are principally three kinds, trees or parts of them, herbaceous plants, and corals; and of the animal kingdom there are four kinds, ſea-ſhells, the teeth or bony palates and bones of fiſhes, complete-fiſhes, and the bones of land-animals. See BONES, TREE, WOOD, PLANT, SHELL, &c.

Theſe adventitious or *extraneous* foſſils, thus found buried in great abundance in divers parts of the earth, have employed the curioſity of ſeveral of our lateſt naturaliſts, who have each their ſeveral ſyſtem to account for the ſurpriſing appearances of petrefied ſea-fiſhes, in places far remote from the ſea, and on the tops of mountains; ſhells in the middle of quarries of ſtone; and of elephants teeth, and bones of divers animals, peculiar to the ſouthern climates, and plants only growing in the eaſt, found foſſile in our northern and weſtern parts.

Some will have theſe ſhells, &c. to be real ſtones, and

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Foſſil, Foſter.

and ſtone plants, formed after the uſual manner of other figured ſtones; of which opinion is the learned Dr Liſter.

Another opinion is, that theſe foſſil ſhells, with all their foreign bodies found within the earth, as bones, trees, plants, &c. were buried therein at the time of the univerſal deluge; and that, having been penetrated either by the bituminous matter abounding chiefly in watery places, or by the ſalts of the earth, they have been preſerved entire, and ſometimes petrefied.

Others think, that thoſe ſhells, found at the tops of the higheſt mountains, could never have been carried thither by the waters, even of the deluge; inaſmuch as moſt of theſe aquatic animals, on account of the weight of their ſhells, always remain at the bottom of the water, and never move but cloſe along the ground. They imagine, that a year's continuance of the waters of the deluge, intermixed with the ſalt waters of the ſea, upon the ſurface of the earth, might well give occaſion to the production of ſhells of diverſe kinds in different climates; and that the univerſal ſaltneſs of the water was the real cauſe of their reſemblance to the ſea-ſhells, as the lakes formed daily by the retention of rain or ſpring water produce different kinds.

Others think, that the waters of the ſea, and the rivers, with thoſe which fell from heaven, turned the whole ſurface of the earth upſide down; after the ſame manner as the waters of the Loire, and other rivers, which roll in a ſandy bottom, overturn all their ſands, and even the earth itſelf, in their ſwellings and inundations; and that in this general ſubverſion, the ſhells came to be interred here, fiſhes there, trees there, &c. See DELUGE.

Dr Woodward, in his Natural Hiſtory of the Earth, purſuing and improving the hypotheſis of Dr Burnet, maintains the whole maſs of earth, with every thing belonging thereto, to have been ſo broken and diſſolved at the time of the deluge, that a new earth was then formed on the boſom of the water, conſiſting of different ſtrata, or beds of terreſtrial matter, ranged over each other uſually according to the order of their ſpecific gravities. By this means, plants, animals, and eſpecially fiſhes and ſhells, not yet diſſolved among the reſt, remained mixed and blended among the mineral and foſſil matters; which preſerved them, or at leaſt aſſumed and retained their figures and impreſſions either indentedly, or in relievo.

See more on this ſubject under the article EARTH, *paſſim*. See alſo PETRIFACTIONS and STRATA.

Foſſile Pitch. See PETROLEUM.

FOSTER (Dr James), a moſt diſtinguiſhed and popular diſſenting miniſter, born at Exeter in 1697. He began to preach in 1718; and ſtrong diſputes ariſing ſoon after, among the diſſenters, concerning the Trinity and ſubſcription to teſts, his judgment determining him to the obnoxious opinions, the clamour grew loud againſt him, and occaſioned more than one removal. His talents were hid among obſcure country congregations, until 1724; when he was choſen to ſucceed Dr Gale in Barbican, where he laboured as paſtor above 20 years. The Sunday evening-lecture, begun in the Old Jury meeting-houſe in 1728, and which he conducted with ſuch uncommon applauſe for more than 20 years, indiſputably ſhowed his abilities as a preacher. Perſons of all perſuaſions and ranks in life flocked to hear him: and Mr Pope has honoured him with a commendatory couplet in his ſatires; which, however, his commentator laboured to deſtroy the intention of by a frivolous note. In 1746, he attended the unhappy lord Kilmarnock, at his execution on Tower-hill; an office which thoſe who lived with him imagined made too deep an impreſſion on his ſympathizing ſpirit, as his vivacity abated from that time. He died in 1753; after having publiſhed ſeveral valuable compoſitions and ſermons; particularly, 1. A Defence of Chriſtianity, againſt Tindal's Chriſtianity as old as the Creation. 2. An Eſſay on Fundamentals. 3. Four volumes of Sermons. 4. Diſcourſes on Natural Religion and Social Virtue, in 4to.

FOSTER (Samuel), an ingenious Engliſh mathematician of the laſt century, and aſtronomical profeſſor in Greſham college, was one of that learned aſſociation which met for cultivating the new philoſophy during the political confuſions, and which Charles II. eſtabliſhed into the Royal Society. Mr Foſter, however, died in 1652, before this incorporation took place; but wrote a number of mathematical and aſtronomical treatiſes, too many to particularize. There were two other mathematical ſtudents of this name; William Foſter, a diſciple of Mr Oughtred, who taught in London; and Mark Foſter, author of a treatiſe on trigonometry, who lived later than the former two.

FOTHER, or FODDER, is a weight of lead, containing eight pigs, and every pig one and twenty ſtone and a half; ſo that it is about a ton or common cart-load. Among the plumbers in London, it is nineteen hundred and a half; and at the mines it is two and twenty hundred and a half. The word is of Teutonic origin, from *fuder*.

FOTHERGILL (Dr George), was born in Weſtmoreland in 1705, where his family had been long ſeated on a competent eſtate that had deſcended regularly for ſeveral generations. After an academical education in Queen's college, Oxford, of which he became a fellow, he was, in 1751, elected principal of St Edmund's-hall, and preſented to the vicarage of Brumley in Hampſhire. Having been long afflicted with an aſthma, he died in 1760. He was the author of a collection of much eſteemed ſermons, in 2 vols 8vo. The firſt volume conſiſts of occaſional diſcourſes, publiſhed by himſelf; the ſecond printed from his MSS.

FOTHERGILL (Dr John), a late eminent phyſician, ſon of John and Margaret, quakers, was born in 1712, at Carr End in Yorkſhire, where his father, who had been a brewer at Knareſborough (after having travelled from one end of America to the other), lived retired on a ſmall eſtate which he cultivated. The Doctor was the ſecond of five children (four ſons and a daughter), and received his education under the care of his grandfather Thomas Hough, a perſon of fortune in Cheſhire (which gave him a predilection for that county), and at Sedburg in Yorkſhire. He afterwards ſerved his time to one Mr Bartlett an apothecary at Bradford. From thence he removed to London, and became a pupil of Dr (afterwards Sir Edward) Wilmot, at St Thomas's Hoſpital. He then went to the univerſity of Edinburgh to ſtudy phyſic, and took his doctor's degree there. From Edinburgh he went to Leyden; whence, after a ſhort ſtay, he returned to London, and began to practiſe about the year 1740, in

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Fothergill

in a houſe in White-hart Court, Lombard-ſtreet, where he reſided during the greateſt part of his life, and acquired moſt of his fortune. In 1746, he was admitted a licentiate of the college of phyſicians in London; and in 1754 a fellow of that of Edinburgh, to which he was a conſiderable benefactor. He afterwards became a member of the Royal Medical Society at Paris, and a member both of the Royal and Antiquarian Societies. He continued his practice with uninterrupted ſucceſs till within the laſt two years of his life, when the illneſs which he had brought on himſelf by unremitted attention, obliged him to give up a conſiderable part of it. Beſides his application to medical ſcience, he had imbibed an early taſte for natural hiſtory, improved by his friend Peter Collinſon, and employed himſelf on coquillage and ſmaller objects of botany. He was for many years a valuable contributor to the Gentleman's Magazine; where his obſervations on the weather and diſeaſes were begun in April 1751, and diſcontinued in the beginning of 1756, being diſappointed in his views of exciting other experienced phyſicians in different parts to imitate the example. He had very extenſive practice, but he did not add to his art any great or various improvements. His pamphlet on the ulcerous ſore throat is, on every account, the beſt of his publications; but owes much of its merit to the information of the late Dr Letherland. It was firſt printed in 1748, on the re-appearance of that fatal diſorder which in 1739 had carried off the two only ſons of Mr Pelham. In 1762 Dr Fothergill purchaſed an eſtate at Upton in Eſſex; and formed a botanic garden there, the ſecond in Europe: Kew is the firſt. In 1766 he began regularly to withdraw, from Midſummer to Michaelmas, from the exceſſive fatigue of his profeſſion, to Lee-Hall, near Middlewich, in Cheſhire; which, though he only rented it by the year, he had ſpared no expence to improve. He took no fees during this receſs, but attended to preſcribe gratis at an inn at Middlewich once a-week. In 1767, after he found himſelf obliged to relax his attention to buſineſs, he removed from his houſe in the city, to reſide in Harpur-ſtreet, Red-Lion Square. Some time before his death he had been induſtrious to contrive a method of generating and preſerving ice in the Weſt-Indies. He was the patron of Sidney Parkinſon, and drew up the preface prefixed to his account of the voyage to the South Seas. At his expence alſo was made and printed an entire new tranſlation of the whole Bible, from the Hebrew and Greek originals, by Anthony Purver, a quaker, in two volumes, 1764, folio, and alſo, in 1780, an edition of biſhop Percy's "Key to the New Teſtament," adapted to the uſe of a ſeminary of young Quakers, at Acworth, near Leeds in Yorkſhire, founded in 1778 by the Society, who purchaſed, by a ſubſcription in which Dr Fothergill ſtood foremoſt, the houſe and an eſtate of thirty acres which the Foundling Hoſpital held there, but which they found inconvenient for their purpoſe on account of diſtance. The Doctor himſelf firſt projected this on the plan of a ſmaller inſtitution of the ſame kind at Gilderſomes. He alſo endowed it handſomely by his will. It now contains above 300 children of both ſexes, who are cloathed and inſtructed. Among the other beneficent ſchemes ſuggeſted by Dr Fothergill were thoſe of bringing fiſh to London by land carriage, which, though it did not in every reſpect ſucceed, tended to deſtroy a ſuppoſed combination; and of rendering bread much cheaper, though equally wholeſome, to the poor, by making it with one part of potatoes and three parts of houſehold flour. But his public benefactions, his encouragements of ſcience, the inſtances of his attention to the health, the police, the convenience of the metropolis, &c. we cannot pretend to ſpecify. The fortune which Dr Fothergill had acquired was immenſe; and, taking all things together, the houſe and moveables in Harpur-ſtreet, the property in Eſſex, and the eſtate in Cheſhire (which he held on a leaſe), and his ready money, amounted to L.80,000. His buſineſs when he was in full practice was calculated at near L. 7000 per annum. In the influenza of 1775 and 1776, he is ſaid to have had 60 patients on his liſt daily, and his profit was eſtimated at L. 8000 per annum.

Fothergill, Fothergilla

The diſorder which haſtened his death was a ſcirrhus of the proſtata, and an obſtruction in the bladder (in which were found after his death two quarts of water), which had been gradually coming on him for ſix years paſt, occaſioned by a delicacy, which made him unwilling to alight from his carriage; and when, after his temporary recovery from it the year before he died, he ſubmitted to uſe relief in his carriage, it was too late. He died at his houſe in Harpur-ſtreet, December 26. 1780; and his remains were interred, January 5. in the Quakers burying-ground at Winchmore-hill, whither they were accompanied by more than 70 coaches and poſt-chaiſes, notwithſtanding the intention of the executors to have the funeral private. The Doctor by his will appointed, that his ſhells, and other pieces of natural hiſtory, ſhould be offered to the late Dr Hunter at L. 500 under the valuation he ordered to be taken of them. Accordingly Dr Hunter bought them for L. 1200. The drawings and collections in natural hiſtory were alſo to be offered to Mr (now Sir Joſeph) Banks at a valuation. His Engliſh portraits and prints, which had been collected by Mr John Nickolls of Ware, and purchaſed by him for 80 guineas, were bought for 200 guineas by Mr Thane. His books were ſold by auction, April 30. 1781, and the eight following days. His houſe and garden at Upton, in which 15 men were conſtantly employed, were valued at L. 10,000. He ſpared no expence to augment this as well as his other collections. He had an ingenious artiſt qualified to collect for him at the Cape of Good Hope, and another on the Alps, and employed for ſeveral years before his death a painter in natural hiſtory at Leeds.

Dr Fothergill's character was excellent. A tranſaction, indeed, with regard to one Dr Leeds, gave occaſion to ſome of his enemies to blame him; but how unjuſtly, has been abundantly ſhown by his biographers Dr Elliott and Dr Lettſome. Beſides the pamphlet already mentioned, Dr Fothergill wrote a conſiderable number of Tracts, which are now collected into one volume 8vo, by Dr Elliott. He ſometimes wrote in the newſpapers, and is ſaid to have been the author of more than 100 letters in the Gazeteer concerning the New Pavement.

FOTHERGILLA, in botany: A genus of the digynia order, belonging to the polyandria claſs of plants.

The

Fothering ‖ Foul.

The calyx is lobed, moſt entire; there is no corolla; the germen bifid; the capſule bilocular; and the cells two-valved; the ſeeds ſolitary and bony.

FOTHERING, a peculiar method of endeavouring to ſtop a leak in the bottom of a ſhip while ſhe is afloat, either under ſail or at anchor. It is uſually performed in the following manner: A baſket is filled with aſhes, cinders, and choped rope-yarns, and looſely covered with a piece of canvas; to this is faſtened a long pole, by which it is plunged repeatedly in the water, as cloſe as poſſible to the place where the lake is conjectured to lie. The oakhum or chopped rope-yarns being thus gradually ſhaken through the twigs, or over the top of the baſket, are frequently ſucked into the hole along with the water, ſo that the leak becomes immediately choaked; and the future entrance of the water is thereby prevented.

FOTHERINGAY, a town of Northamptonſhire, about four miles from Staneford, ſituated on the river Avon or Nen, and conſiſting of one ſtreet. Edward duke of York in the reign of Henry V. founded and endowed a fine collegiate church here, in which he was interred. At the Diſſolution the college and the choir were pulled down, and the bodies of the founder and his family left expoſed till queen Elizabeth's time, who ordered them to be interred, and the preſent monuments to be erected. On the north ſide of the church is a free ſchool, founded by Henry VII. or Edward VI. endowed with L.20 *per annum* for a maſter, payable out of the exchequer by the receiver of the county. The bridge over the river here was firſt built by queen Elizabeth, 1573, of timber, with three pillars upon the foundation. Daniel, firſt earl of Nottingham, and the other truſtees for William Saville, marquis of Halifax, rebuilt it, in 1722, of freeſtone from King's Cliffe. On the ſouth-eaſt ſide of the Cliffe ſtood the caſtle; which was of great antiquity and conſiderable ſtrength. Mary queen of Scots, who had been in the cuſtody of Sir Amias Powlet here, was tried and beheaded in the hall; and her ſon afterwards, forgiving and even taking into favour her greateſt enemy Cecil, only took the childiſh revenge of beating down the caſtle; which he ſo completely demoliſhed, that no more than the earthworks now remain. Within the firſt work is a farm-houſe with ſome carved ſtones wrought into it, and at the ſouth-weſt corner of the inner trench are ſome maſſes of ſtone-walls. Sir Robert Cotton carried the wainſcot of the hall to Connington.

FOU-TCHEOU, a city of China, in the province of Fo-kien. It carries on a conſiderable trade; but is chiefly remarkable for the magnificence of its principal bridge, which has more than 100 arches, conſtructed of white ſtone, and ornamented with a double baluſtrade throughout. This city is the reſidence of a viceroy, and has under its juriſdiction nine cities of the third claſs.

FOUGADE, or FOUGASSE, in the art of war, a little mine, about 8 or 10 feet wide, and 10 or 12 deep, dug under ſome work or poſt, which is in danger of falling into the enemy's hands; and charged with ſacks of powder, covered with ſtones, earth, and whatever elſe can make great deſtruction. It is ſet on fire like other mines, with a fauciſſe. See MINE.

FOUL, or FOULE, in the ſea-language, is uſed when a ſhip has been long untrimmed, ſo that the graſs-weeds, or barnacles, grow to her ſides under water. A rope is alſo foul when it is either tangled in itſelf, or hindered by another, ſo that it cannot run or be over-hawled.

Foul ‖ Foundation.

FOUL imports, alſo, the running of one ſhip againſt another. This happens ſometimes by the violence of the wind, and ſometimes by the careleſſneſs of the people on board, to ſhips in the ſame convoy, and to ſhips in port by means of others coming in. The damages occaſioned by running foul, are of the nature of thoſe in which both parties muſt bear a ſhare. They are uſually made half to fall upon the ſufferer, and half upon the veſſel which did the injury: but in caſes where it is evidently the fault of the maſter of the veſſel, he alone is to bear the damage.

FOUL-Water. A ſhip is ſaid to make foul-water, when, being under ſail, ſhe comes into ſuch ſhoal-water, that though her keel do not touch the ground, yet it comes ſo near it, that the motion of the water under her raiſes the mud from the bottom.

FOUL is alſo a diſeaſe in cattle, proceeding from blood, and a wateriſh rheum that falls down into the legs, and makes them ſwell.

FOUL or *Pimpled Face*. See *GUTTA Roſacea*.

FOULA, or *FOUL Iſland*, one of the Shetland iſles, lying between ſix and ſeven leagues weſt from the main land. It is about three miles long, narrow, and full of rough, ſteep, and bare rocks; one of which is ſo large, and runs up to ſuch an height, that it may be clearly ſeen from Orkney. This, therefore, may be reckoned with the greateſt probability to be the Thule of Tacitus, whatever might be the Thule of the Phenicians and Greeks. It has ſcarce any paſturage, and but very little arable land; but that, however ſmall in extent, is very fertile, out of the produce of which, with fowl and fiſh, the poor inhabitants ſubſiſt. They have nothing that can be called a port; and the only commodities they have are ſtock-fiſh, train-oil, and feathers.

FOUMART, in zoology, a ſpecies of MUSTELA.

FOUNDATION, in architecture, is that part of a building which is under-ground. See ARCHITECTURE, n° 96 *et ſeq.* and n° 130, &c.

Palladio allows a ſixth part of the height of the whole building for the hollowing or under-digging; unleſs there be cellars under ground, in which caſe he would have it ſomewhat lower.

FOUNDATION, denotes alſo a donation or legacy, either in money or lands, for the maintenance and ſupport of ſome community, hoſpital, ſchool, &c.

The king only can found a college, but there may be a college in reputation founded by others. If it cannot appear by inquiſition who it was that founded a church or college, it ſhall be intended that it was the king, who has power to found a new church, &c. The king may found and erect an hoſpital, and give a name to the houſe upon the inheritance of another, or licenſe another perſon to do it upon his own lands; and the words *fundo*, *creo*, &c. are not neceſſary in every foundation, either of a college or hoſpital, made by the king; but it is ſufficient if there be words equivalent: the incorporation of a college or hoſpital is the very foundation; but he who endows it with lands is the founder; and to the erection of an hoſpital, nothing more is requiſite but the incorporation and foundation. *Jacob's Law Dict.*

Perſons

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Founder, Foundery.

Persons seised of estates in fee-simple, may erect and found hospitals for the poor by deed enrolled in chancery, &c. which shall be incorporated, and subject to such visitors as the founder shall appoint, &c. stat. 39 Eliz. c. 5.

FOUNDER, in a general sense, the person who lays a foundation, or endows a church, school, religious house, or other charitable institution. See FOUNDATION.

FOUNDER, also implies an artist who casts metals, in various forms, for different uses, as guns, bells, statues, printing-characters, candlesticks, buckles, &c. whence they are denominated gun-founders, bell-founders, figure-founders, letter-founders, founders of small works, &c. See FOUNDERY.

FOUNDER, in the sea-language: A ship is said to founder, when by an extraordinary leak, or by a great sea breaking in upon her, she is so filled with water, that she cannot be freed of it; so that she can neither veer nor steer, but lie like a log; and not being able to swim long, will at last sink.

FOUNDERED, in farriery. See there, § xli.

FOUNDERY, or FOUNDRY, the art of casting all sorts of metals into different forms. It likewise signifies the work-house or smelting-hut wherein these operations are performed.

FOUNDRY of Small Works, or Casting in Sand. The sand used for casting small-works is at first of a pretty soft, yellowish, and clammy nature: but it being necessary to strew charcoal-dust in the mould, it at length becomes of a quite black colour. This sand is worked over and over, on a board, with a roller, and a sort of knife; being placed over a trough to receive it, after it is by these means sufficiently prepared.

This done, they take a wooden board of a length and breadth proportional to the things to be cast, and putting a ledge round it, they fill it with sand, a little moistened, to make it duly cohere. Then they take either wood or metal models of what they intend to cast, and apply them so to the mould, and press them into the sand, as to leave their impression there. Along the middle of the mould is laid half a small brass cylinder, as the chief canal for the metal to run through, when melted, into the models or patterns; and from this chief canal are placed several others, which extend to each model or pattern placed in the frame. After this frame is finished, they take out the patterns, by first loosening them all round, that the sand may not give way.

Then they proceed to work the other half of the mould with the same patterns in just such another frame; only that it has pins, which, entering into holes that correspond to it in the other, make the two cavities of the pattern fall exactly on each other.

The frame, thus moulded, is carried to the melter; who, after extending the chief canal of the counterpart, and adding the cross canals to the several models in both, and strewing mill-dust over them, dries them in a kind of oven for that purpose.

Both parts of the mould being dry, they are joined together by means of the pins; and to prevent their giving way, by reason of the melted metal passing thro' the chief cylindrical canal, they are screwed or wedged up like a kind of press.

While the moulds are thus preparing, the metal is fusing in a crucible of a size proportionate to the quantity of metal intended to be cast. Foundery.

When the moulds are cooliſh, the frames are unscrewed, or unwedged, and the cast work taken out of the sand, which sand is worked over again for other castings.

FOUNDRY of Statues. The casting of statues depends on the due preparation of the pit, the core, the wax, the outer mould, the inferior furnace to melt off the wax, and the upper to fuse the metal. The pit is a hole dug in a dry place something deeper than the intended figure, and made according to the prominence of certain parts thereof. The inside of the pit is commonly lined with stone, or brick; or, when the figure is very large, they sometimes work on the ground, and raise a proper fence to resist the impulsion of the melted metal.

The inner mould, or core, is a rude mass to which is given the intended attitude and contours. It is raised on an iron grate, strong enough to sustain it, and is strengthened within by several bars of iron. It is generally made either of potter's clay, mixed with hair and horse-dung; or of plaster of Paris mixed with brick-dust. The use of the core is to support the wax, the shell, and lessen the weight of the metal. The iron bars and the core are taken out of the brass figure through an aperture left in it for that purpose, which is soldered up afterwards. It is necessary to leave some of the iron bars of the core, that contribute to the steadiness of the projecting part, within the brass figure.

The wax is a representation of the intended statue. If it be a piece of sculpture, the wax should be all of the sculptor's own hand, who usually forms it on the core: Though it may be wrought separately in cavities, moulded on a model, and afterwards arranged on the ribs of iron over the grate; filling the vacant space in the middle with liquid plaster and brick-dust, whereby the inner core is proportioned as the sculptor carries on the wax.

When the wax, which is the intended thickness of the metal, is finished, they fill small waxen tubes perpendicular to it from top to bottom, to serve both as canals for the conveyance of the metal to all parts of the work; and as vent-holes, to give passage to the air, which would otherwise occasion great disorder when the hot metal came to encompass it.

The work being brought thus far, must be covered with its shell, which is a kind of crust laid over the wax, and which being of a soft matter, easily receives the impression of every part, which is afterwards communicated to the metal upon its taking the place of the wax, between the shell and the mould. The matter of this outer mould is varied according as different layers are applied. The first is generally a composition of clay, and old white crucibles well ground and sifted, and mixed up with water to the consistence of a colour fit for painting: accordingly they apply it with a pencil, laying it seven or eight times over, and letting it dry between whiles. For the second impression, they add horse-dung and natural earth to the former composition. The third impression is only horse-dung and earth. Lastly, the shell is finished by laying on several more impressions of this last matter, made very thick with the hand.

The shell, thus finished, is secured by several iron girths,

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Foundery. girths, bound round it, at about half a foot diſtance from each other, and faſtened at the bottom to the grate under the ſtatue, and at top to a circle of iron where they all terminate.

If the ſtatue be ſo big that it would not be eaſy to move the moulds with ſafety, they muſt be wrought on the ſpot where it is to be caſt. This is performed two ways: in the firſt, a ſquare hole is dug under ground, much bigger than the mould to be made therein, and its inſide lined with walls of free-ſtone or brick. At the bottom is made a hole of the ſame materials, with a kind of furnace, having its aperture outwards: in this is a fire made to dry the mould, and afterwards melt the wax. Over this furnace is placed the grate, and upon this the mould, &c. formed as above. Laſtly, at one of the edges of the ſquare pit, is made another large furnace to melt the metal. In the other way, it is ſufficient to work the mould above ground, but with the like precaution of a furnace and grate underneath. When finiſhed, four walls are to be run around it, and by the ſide thereof a maſſive made for a melting-furnace. For the reſt the method is the ſame in both. The mould being finiſhed, and incloſed as deſcribed, whether under ground or above it, a moderate fire is lighted in the furnace under it, and the whole covered with planks, that the wax may melt gently down, and run out at pipes contrived for that purpoſe, at the foot of the mould, which are afterwards exactly cloſed with earth, ſo ſoon as the wax is carried off. This done, the hole is filled up with bricks thrown in at random, and the fire in the furnace augmented, till ſuch time as both the bricks and mould become red hot. After this, the fire being extinguiſhed, and every thing cold again, they take out the bricks, and fill up their place with earth moiſtened, and a little beaten to the top of the mould, in order to make it the more firm and ſteady. Theſe preparatory meaſures being duly taken, there remains nothing but to melt the metal, and run it into the mould. This is the office of the furnace above deſcribed, which is commonly made in the form of an oven with three apertures, one to put in the wood, another for a vent, and a third to run the metal out at. From this laſt aperture, which is kept very cloſe, while the metal is in fuſion, a ſmall tube is laid, whereby the melted metal is conveyed into a large earthen baſon, over the mould, into the bottom of which all the big branches of the jets, or caſts, which are to convey the metal into all the parts of the mould, are inſerted.

Theſe caſts or jets are all terminated with a kind of plugs, which are kept cloſe, that, upon opening the furnace, the braſs, which guſhes out with violence, may not enter any of them, till the baſon be full enough of matter to run into them all at once. Upon which occaſion they pull out the plugs, which are long iron rods with a head at one end, capable of filling the whole diameter of each tube. The whole of the furnace is opened with a long piece of iron fitted at the end of each pole, and the mould filled in an inſtant. This completes the work in relation to the caſting part; the reſt being the ſculptor's or carver's buſineſs, who, taking the figure out of the mould and earth wherewith it is encompaſſed, ſaws off the jets with which it appears covered over, and repairs it with chiſſels, gravers, puncheons, &c.

Foundery of Bells. The metal, it is to be obſerved, is different for bells from what it is for ſtatues; there being no tin in the ſtatue-metal: but there is a fifth, and ſometimes more, in the bell-metal. Foundery.

The dimenſions of the core and the wax for bells, if a ring of bells eſpecially, are not left to chance, but muſt be meaſured on a ſcale, or diapaſon, which gives the height, aperture, and thickneſs, neceſſary for the ſeveral tones required.

It is on the wax that the ſeveral mouldings and other ornaments and inſcriptions, to be repreſented in relievo on the outſide of the bell, are formed. The clapper or tongue is not properly a part of the bell, but is furniſhed from other hands. In Europe, it is uſually of iron, with a large knob at the extreme; and is ſuſpended in the middle of the bell. In China, it is only a huge wooden mallet, ſtruck by force of arm againſt the bell; whence they can have but little of that conſonancy ſo much admired in ſome of our rings of bells. The Chineſe have an extraordinary way of increaſing the ſound of their bells; viz. by leaving a hole under the cannon; which our bell-founders would reckon a defect.

The proportions of our bells differ very much from thoſe of the Chineſe. In ours, the modern proportions are, to make the diameter 15 times the thickneſs of the brim, and the height 12 times. The parts of a bell are, 1. The ſounding bow, terminated by an inferior circle, which grows thinner and thinner, 2. The brim or that part of a bell whereon the clapper ſtrikes, and which is thicker than the reſt. 3. The outward ſinking of the middle of the bell, or the point under which it grows wider to the brim. 4. The waiſt or furniture, and the part that grows wider and thicker quite to the brim. 5. The upper vaſe, or that part which is above the waiſt. 6. The pallet which ſupports the ſtaple of the clapper within. 7. The bent and hollowed branches of metal uniting with the cannons, to receive the iron keys, whereby the bell is hung up to the beam, which is its ſupport and counterpoiſe, when rung out.

The buſineſs of bell-foundery is reducible to three particulars. 1. The proportion of a bell. 2. The forming of the mould. And, 3. The melting of the metal. There are two kinds of proportions, viz. the ſimple and the relative; the former are thoſe proportions only that are between the ſeveral parts of a bell to render it ſonorous; the relative proportions eſtabliſh a requiſite harmony between ſeveral bells.

The method of forming the profile of a bell, previous to its being caſt, in which the proportion of the ſeveral parts may be ſeen, is as follows: the thickneſs of the brim, C1 (Plate CXCV.) is the foundation of every other meaſure, and is divided into three equal parts. Firſt, draw the line HD, which repreſents the diameter of the bell; biſect it in F and erect the perpendicular F f; let D F and H F be alſo biſected in E and G, and two other perpendiculars E e, G a, be erected at E and G: G E will be the diameter of the top or upper vaſe, *i. e.* the diameter of the top will be half that of the bell; and it will, therefore, be the diameter of a bell which will ſound an octave to the other. Divide the diameter of the bell or the line H D into 15 equal parts, and one of theſe will give C1 the thickneſs of the brim; divide again each of theſe

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Foundery

these 15 equal parts into three other equal parts, and then form a scale. From this scale take 12 of the larger divisions or $\frac{2}{15}$ of the whole scale in the compass, and setting one leg in D describe an arc to cut the line E e in N; draw N D, and divide this line into 12 equal parts; at the point 1 erect the perpendicular 1 C = 10, and C 1 will be the thickness of the brim $= \frac{1}{15}$ of the diameter: draw the line C D: bisect D N; and at the point of bisection 6 erect the perpendicular 6 K = $1\frac{1}{2}$ of the larger divisions on the scale. With an opening of the compass equal to twice the length of the scale or 30 brims, setting one leg in N, describe an arc of a circle, and with the same leg in K and the same opening describe another arc to intersect the former: on this point of intersection as a centre, and with a radius equal to 30 brims, describe the arc N K; in 6 K produced take K B = $\frac{1}{7}$ of the larger measure of the scale or $\frac{1}{7}$ of the brim, and on the same centre with the radius $30\frac{1}{7}$ brims describe an arc A B parallel to N K. For the arc BC, take 12 divisions of the scale or 12 brims in the compass; find a centre, and from that centre, with this opening, describe the arc BC, in the same manner as N K or A B were described. There are various ways of describing the arc K p; some describe it on a centre at the distance of nine brims from the points p and K; others, as it is done in the figure, on a centre at the distance only of seven brims from those points. But it is necessary first to find the point p, and to determine the rounding of the bell p 1. For this purpose, on the point C as a centre, and with the radius C 1, describe the arc 1 p n; bisect the part 1, 2 of the line D n, and erecting the perpendicular p m, this perpendicular will cut the arc 1 p n in m, which terminates the rounding 1 p. Some founders make the bendings K a third of a brim lower than the middle of the line D N; others make the part C 1 D more acute, and instead of making C 1 perpendicular to DN at 1, draw it $\frac{1}{3}$th of a brim higher, making it still equal to one brim; so that the line 1 D is longer than the brim C 1. In order to trace out the top-part N *a*, take in the compass eight divisions of the scale or eight brims, and on the points N and D as centres, describe arcs to intersect each other in 8: on this point 8, with a radius of eight brims, describe the arc N b; this arc will be the exterior curve of the top or crown: on the same point 8 as a centre, and with a radius equal to $7\frac{1}{2}$ brims, describe the arc A e, and this will be the interior curve of the crown, and its whole thickness will be one third of the brim. As the point 8 does not fall in the axis of the bell, a centre M may be found in the axis by describing, with the interval of eight brims on the centres D and H, arcs which will intersect in M; and this point may be made the centre of the inner and outer curves of the crown as before. The thickness of the cap which strengthens the crown at Q is about one-third of the thickness of the brim; and the hollow branches or ears about one-fixth of the diameter of the bell. The height of the bell is in proportion to its diameter as 12 to 15, or in the proportion of the fundamental sound to its third major: whence it follows, that the sound of a bell is principally composed of the sound of its extremity or brim, as a fundamental of the sound of the crown which is an octave to it, and of that of the height which is a third.

The particulars necessary for making the mould of a bell are, 1. The earth: the most cohesive is the best; it must be well ground and sifted, to prevent any chinks. 2. Brick-stone; which must be used for the mine, mould, or core, and for the furnace. 3. Horse-dung, hair, and hemp, mixed with the earth, to render the cement more binding. 4. The wax for inscriptions, coats of arms, &c. 5. The tallow equally mixed with the wax, in order to put a slight lay of it upon the outer mould, before any letters are applied to it. 6. The coals to dry the mould. Foundery.

For making the mould, they have a scaffold consisting of four boards, ranged upon tressels. Upon this they carry the earth, grossly diluted, to mix it with horse-dung, beating the whole with a large spatula.

The compasses of construction is the chief instrument for making the mould, which consist of two different legs joined by a third piece. And last of all, the founders shelves, on which are the engravings of the letters, cartridges, coats of arms, &c.

They first dig a hole of a sufficient depth to contain the mould of the bell, together with the case or cannon, under ground; and about six inches lower than the terreplain, where the work is performed. The hole must be wide enough for a free passage between the mould and walls of the hole, or between one mould and another, when several bells are to be cast. At the centre of the hole is a stake erected, that is strongly fastened in the ground. This supports an iron peg, on which the pivot of the second branch of the compasses turns. The stake is encompassed with a solid brick-work, perfectly round, about half a foot high, and of the proposed bell's diameter. This they call a *mill-stone*. The parts of the mould are, the core, the model of the bell, and the shell. When the outer surface of the core is formed, they begin to raise the core, which is made of bricks that are laid in courses of equal height upon a lay of plain earth. At the laying of each brick, they bring near it the branch of the compasses, on which the curve of the core is shaped, so as that there may remain between it and the curve the distance of a line, to be afterwards filled up with layers of cement. The work is continued to the top, only leaving an opening for the coals to bake the core. This work is covered with a layer of cement, made of earth and horse-dung; on which they move the compasses of construction, to make it of an even smoothness every where.

The first layer being finished, they put the fire to the core, by filling it half with coals, through an opening that is kept shut, during the baking, with a cake of earth that has been separately baked. The first fire consumes the stake, and the fire is left in the core half or sometimes a whole day: the first layer being thoroughly dry, they cover it with a second, third, and fourth; each being smoothed by the board of the compasses, and thoroughly dried before they proceed to another.

The core being completed, they take the compasses to pieces, with intent to cut off the thickness of the model, and the compasses are immediately put in their place to begin a second piece of the mould. It consists of a mixture of earth and hair, applied with the hand on the core, in several cakes that close together. This work is finished by several layers of a thinner cement of the same matter, smoothed by the compasses,

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Foundery. and thoroughly dried before another is laid on. The first layer of the model is a mixture of wax and grease spread over the whole. After which are applied the inscriptions, coats of arms, &c. besmeared with a pencil dipped in a vessel of wax in a chafing-dish: this is done for every letter. Before the shell is begun, the compasses are taken to pieces, to cut off all the wood that fills the place of the thickness to be given to the shell.

The first layer is the same earth with the rest, sifted very fine; whilst it is tempering in water, it is mixed with cow's hair to make it cohere. The whole being a thin cullis, is gently poured on the model, that fills exactly all the sinuosities of the figures, &c. and this is repeated till the whole is two lines thick over the model. When this layer is thoroughly dried, they cover it with a second of the same matter, but somewhat thicker; when this second layer becomes of some consistence, they apply the compasses again, and light a fire in the core, so as to melt off the wax of the inscriptions, &c.

After this, they go on with other layers of the shell, by means of the compasses. Here they add to the cow's hair a quantity of hemp, spread upon the layers, and afterwards smoothed by the board of the compasses. The thickness of the shell comes to four or five inches lower than the mill-stone before observed, and surrounds it quite close, which prevents the extravasation of the metal. The wax should be taken out before the melting of the metal.

The ear of the bell requires a separate work, which is done during the drying of the several incrustations of the cement. It has seven rings: the seventh is called the *bridge*, and unites the others, being a perpendicular support to strengthen the curves. It has an aperture at the top, to admit a large iron peg, bent at the bottom; and this is introduced into two holes in the beam, fastened with two strong iron keys. There are models made of the rings, with masses of beaten earth, that are dried in the fire, in order to have the hollow of them. These rings are gently pressed upon a layer of earth and cow's hair, one half of its depth; and then taken out, without breaking the mould. This operation is repeated 12 times for 12 half-moulds, that two and two united may make the hollows of the six rings: the same they do for the hollow of the bridge, and bake them all, to unite them together.

Upon the open place left for the coals to be put in, are placed the rings that constitute the ear. They first put into this open place the iron-ring to support the clapper of the bell; then they make a round cake of clay, to fill up the diameter of the thickness of the core. This cake, after baking, is clapped upon the opening, and soldered with a thin mortar spread over it, which binds the cover close to the core.

The hollow of the model is filled with an earth, sufficiently moist to fix on the place, which is strewed at several times upon the cover of the core; and they beat it gently with a pestle, to a proper height; and a workman smooths the earth at top with a wooden trowel dipped in water.

Upon this cover, to be taken off afterwards, they assemble the hollows of the rings. When every thing is in its proper place, they strengthen the outside of the hollows with mortar, in order to bind them with the bridge, and keep them steady at the bottom, by means Foundery. of a cake of the same mortar, which fills up the whole aperture of the shell. This they let dry, that it may be removed without breaking. To make room for the metal, they pull off the hollows of the rings, through which the metal is to pass, before it enters into the vacuity of the mould. The shell being unloaded of its ear, they range under the millstone five or six pieces of wood, about two feet long, and thick enough to reach almost the lower part of the shell; between these and the mould, they drive in wooden wedges with a mallet, to shake the shell of the model whereon it rests, so as to be pulled up and got out of the pit.

When this and the wax are removed, they break the model and the layer of earth, through which the metal must run, from the hollow of the rings, between the shell and the core. They smoke the inside of the shell, by burning straw under it, that helps to smooth the surface of the bell. Then they put the shell in the place, so as to leave the same interval between that and the core; and before the hollows of the rings or the cap are put on again, they add two vents, that are united to the rings, and to each other, by a mass of baked cement. After which they put on this mass of the cap, the rings, and the vent, over the shell, and solder it with thin cement, which is dried gradually by covering it with burning coals. Then they fill up the pit with earth, beating it strongly all the time round the mould.

The furnace has a place for the fire, and another for the metal. The fire-place has a large chimney with a spacious ash-hole. The furnace which contains the metal is vaulted, whose bottom is made of earth, rammed down; the rest is built with brick. It has four apertures; the first, through which the flame revibrates; the second is closed with a stopple that is opened for the metal to run; the others are to separate the dross or scoriæ of the metal by wooden rakes: through these last apertures passes the thick smoke. The ground of the furnace is built sloping, for the metal to run down.

Foundery of Great Guns and Mortar-Pieces. The method of casting these pieces is little different from that of bells: they are run massy, without any core, being determined by the hollow of the shell; and they are afterwards bored with a steel trepan, that is worked either by horses or a water-mill.

For the metal, parts, proportions, &c. of these pieces, see Gunnery.

Letter-Foundery, or *Casting of Printing-Letters.*

In the business of cutting, casting, &c. letters for printing, the letter-cutter must be provided with a vice, hand-vice, hammers, and files of all sorts for watch-makers use; as also gravers and sculpters of all sorts, and an oil-stone, &c. suitable and sizeable to the several letters to be cut: a flat gage made of box to hold a rod of steel, or the body of a mould, &c. exactly perpendicular to the flat of the using-file: a sliding-gage whose use is to measure and set off distances between the shoulder and the tooth, and to mark it off from the end, or from the edge of the work: a face-gage, which is a square notch cut with a file into the edge of a thin plate of steel, iron, or brass, of the thickness of a piece of common tin, whose use is to proportion the face of each sort of letter, *viz.* long letters, ascending

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cending letters, and ſhort letters. So there muſt be three gages, and the gage for the long letters is the length of the whole body ſuppoſed to be divided into 42 equal parts. The gage for the aſcending letters Roman and Italic are $\frac{1}{7}$, or 30 parts of 42, and 33 parts for the Engliſh face. The gage for the ſhort letters is $\frac{3}{7}$, or 18 parts of 42 of the whole body for the Roman and Italic, and 22 parts for the Engliſh face.

The Italic and other ſtanding gages are to meaſure the ſcope of the Italic ſtems, by applying the top and bottom of the gage to the top and bottom lines of the letters, and the other ſide of the gage to the ſtem; for when the letter complies with theſe three ſides of the gage, that letter has its true ſhape.

The next care of the letter-cutter is to prepare good ſteel punches, well tempered, and quite free from all veins of iron; on the face of which he draws or marks the exact ſhape of the letter with pen and ink if the letter be large, or with a ſmooth blunted point of a needle if it be ſmall; and then with ſizeable and proper ſhaped and pointed gravers and ſculpters, digs or ſculps out the ſteel between the ſtrokes or marks he made on the face of the punch, and leaves the marks ſtanding on the face. Having well ſhaped the inſide ſtrokes of his letter, he deepens the hollows with the ſame tools; for if a letter be not deep in proportion to its width, it will, when uſed at preſs, print black, and be good for nothing. This work is generally regulated by the depth of the counter-punch. Then he works the outſide with proper files till it be fit for the matrice.

But before we proceed to the ſinking and juſtifying of the matrices, we muſt provide a mould to juſtify them by, of which you have a draught in Plate CXCV. fig. 1. 2.

Every mould is compoſed of an upper and an under part. The under part is delineated in fig. 1. The upper part is marked fig. 2. and is in all reſpects made like the under part, excepting the ſtool behind, and the bow or ſpring alſo behind; and excepting a ſmall roundiſh wire between the body and carriage, near the break, where the under part hath a ſmall rounding groove made in the body. This wire, or rather half-wire, in the upper part makes the nick in the ſhank of the letter, when part of it is received into the groove in the under part. Theſe two parts are ſo exactly fitted and gaged into one another (*viz.* the male-gage marked *c* in fig. 2. into the female marked *g* in fig. 1. that when the upper part of the mould is properly placed on, and in the under part of the mould, both together make the entire mould, and may be ſlid backwards for uſe ſo far, till the edge of either of the bodies on the middle of either carriage comes juſt to the edge of the female gages cut in each carriage: and they may be ſlid forward ſo far, till the bodies on either carriage touch each other: and the ſliding of theſe two parts of the mould backwards makes the ſhank of the letter thicker, becauſe the bodies in each part ſtand wider aſunder; and the ſliding them forwards makes the ſhank of the letter thinner, becauſe the bodies on each part of the mould ſtand cloſer together. The parts of the mould are as follow: *viz.* a, The carriage. b, The body. c, The male gage. d e, The mouth-piece. f i, The regiſter. g, The female gage. h, The hag. *a a a a*, The bottom plate. *b b b*, The wood on which the bottom plate lies. *c c c*, The mouth. *d d*, The throat, *e d d*, The pallat. *f*, The nick. *g g*, The ſtool. *h h*, The ſpring or bow.

Then the mould muſt be juſtified: and firſt the founder juſtifies the body, by caſting about 20 proofs or ſamples of letters; which are ſet up in a compoſing ſtick, with all their nicks towards the right hand; and then by comparing theſe with the pattern letters, ſet up in the ſame manner, he finds the exact meaſure of the body to be caſt. He alſo tries if the two ſides of the body are parallel, or that the body be no bigger at the head than at the foot, by taking half the number of his proofs and turning them with their heads to the feet of the other half; and if then the heads and the feet be found exactly even upon each other, and neither to drive out nor get in, the two ſides may be pronounced parallel. He farther tries whether the two ſides of the thickneſs of the letter be parallel, by firſt ſetting his proofs in the compoſing ſtick with their nicks upwards, and then turning one half with their heads to the feet of the other half; and if the heads and feet lie exactly upon each other, and neither drive out nor get in, the two ſides of the thickneſs are parallel.

The mould thus juſtified, the next buſineſs is to prepare the matrices. A matrice is a piece of braſs or copper of about an inch and a half long, and of a thickneſs in proportion to the ſize of the letter it is to contain. In this metal is ſunk the face of the letter intended to be caſt, by ſtriking the letter punch about the depth of an n. After this the ſides and face of the matrice muſt be juſtified and cleared with files of all bunchings made by ſinking the punch.

Every thing thus prepared, it is brought to the furnace; which is built of brick upright, with four ſquare ſides, and a ſtone on the top, in which ſtone is a wide round hole for the pan to ſtand in. A foundery of any conſequence has ſeveral of theſe furnaces in it.

As to the metal of which the types are to be caſt, this, in extenſive founderies, is always prepared in large quantities; but caſt into ſmall bars, of about 20 pounds weight, to be delivered out to the workmen as occaſion requires. In the letter foundery which has been long carried on with reputation under the direction of Dr Alex. Wilſon and ſons at Glaſgow, we are informed, that a ſtock of metal is made up at two different times of the year, ſufficient to ſerve the caſters at the furnace for ſix months each time. For this purpoſe, a large furnace is built under a ſhade, furniſhed with a wheel vent, in order the more equally to heat the ſides of a ſtrong pot of caſt-iron, which holds when full 15 hundred weight of the metal. The fire being kindled below, the bars of lead are let ſoftly down into the pot, and their fuſion promoted by throwing in ſome pitch and tallow, which ſoon inflame. An outer chimney, which is built ſo as to project about a foot over the fartheſt lip of the pot, catches hold of the flame by a ſtrong draught, and makes it act very powerfully in melting lead; whilſt it ſerves at the ſame time to convey away all the fumes, &c. from the workmen, to whom this laborious part of the buſineſs is committed. When the lead is thoroughly melted, a due proportion of the regulus of antimony and other ingredients are put in, and ſome more tallow is inflamed to make the whole incorporate ſooner. The workmen now having mixed the contents of the pot very thoroughly,

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Foundery. roughly by ſtirring long with a large iron ladle, next proceed to draw the metal off into the ſmall troughs of caſt-iron, which are ranged to the number of four-ſcore upon a level platform faced with ſtone, built towards the right hand. In the courſe of a day 15 hundred weight of metal can be eaſily prepared in this manner; and the operation is continued for as many days as are neceſſary to prepare a ſtock of metal of all the various degrees of hardneſs. After this, the whole is diſpoſed into preſſes according to its quality, to be delivered out occaſionally to the workmen.

The founder muſt now be provided with a ladle, which differs nothing from other iron ladles but in its ſize; and he is provided always with ladles of ſeveral ſizes, which he uſes according to the ſize of the letters he is to caſt. Before the caſter begins to caſt, he muſt kindle his fire in the furnace to melt the metal in the pan. Therefore he takes the pan out of the hole in the ſtone, and there lays in coals and kindles them; and, when they are well kindled, he ſets the pan in again, and puts in metal into it to melt: if it be a ſmall-bodied letter he caſts, or a thin letter of great bodies, his metal muſt be very hot; nay ſometimes red-hot, to make the letter come. Then having choſen a ladle than will hold about ſo much as the letter and break is, he lays it at the ſtoking-hole, where the flame burſts out, to heat. Then he ties a thin leather, cut with its narrow end againſt the face to the leather groove of the matrice, by whipping a brown thread twice about the leather-groove, and faſtening the thread with a knot. Then he puts both halves of the mould together, and puts the matrice into the matrice-cheek, and places the foot of the matrice on the ſtool of the mould, and the broad end of the leather upon the wood of the upper half of the mould, but not tight up, leſt it might hinder the foot of the matrice from ſinking cloſe down upon the ſtool in a train of work. Then laying a little roſin on the upper wood of the mould, and having his caſting-ladle hot, he with the boiling ſide of it melts the roſin: and, when it is yet melted, preſſes the broad end of the leather hard down on the wood, and ſo faſtens it to the wood; all this is the preparation.

Now he comes to caſting. Wherefore, placing the under half of the mould in his left hand, with the hook or hag forward, he clutches the ends of its wood between the lower part of the ball of his thumb and his three hind fingers; then he lays the upper half of the mould upon the under half, ſo that the male gages may fall into the female gages, and at the ſame time the foot of the matrice places itſelf upon the ſtool; and, claſping his left-hand thumb ſtrong over the upper half of the mould, he nimbly catches hold of the bow or ſpring with his right-hand fingers at the top of it, and his thumb under it, and places the point of it againſt the middle of the notch in the backſide of the matrice, preſſing it as well forwards towards the mould, as downwards by the ſhoulder of the notch cloſe upon the ſtool, while at the ſame time with his hinder fingers, as aforeſaid, he draws the under half of the mould towards the ball of his thumb, and thruſts by the ball of his thumb the upper part towards his fingers, that both the regiſters of the mould may preſs againſt both ſides of the matrice, and his thumb and fingers preſs both halves of the mould cloſe together.

Then he takes the handle of his ladle in his right hand, and with the boll of it gives a ſtroke, two or three, outwards upon the ſurface of the melted metal, to ſcum or clear it from the film or duſt that may ſwim upon it; then takes up the ladle full of metal, and having his mould, as aforeſaid, in his left hand, he a little twiſts the left ſide of his body from the furnace, and brings the geat of his ladle (full of metal) to the mouth of the mould, and twiſts the upper part of his right hand towards him to turn the metal into it, while at the ſame moment of time he jilts the mould in his left hand forwards, to receive the metal with a ſtrong ſhake (as it is called), not only into the body of the mould, but while the metal is yet hot running, ſwift and ſtrongly, into the very face of the matrice, to receive its perfect form there, as well as in the ſhank. Foundery.

Then he takes the upper half of the mould off the under half, by placing his right-hand thumb on the end of the wood next his left-hand thumb, and his two middle-fingers at the other end of the wood; and finding the letter and break lie in the under half of the mould (as moſt commonly by reaſon of its weight it does), he throws or toſſes the letter, break and all, upon a ſheet of waſte paper laid for that purpoſe on the bench, juſt a little beyond his left hand, and is then ready to caſt another letter as before; and alſo, the whole number that is to be caſt with that matrice. A workman will ordinarily caſt about three thouſand of theſe letters in a day.

When the caſters at the furnace have got a ſufficient number of types upon the tables, a ſet of boys come and nimbly break away the jets from them: the jets are thrown into the pots, and the types are carried away in parcels to other boys, who paſs them ſwiftly under their fingers, defended by leather, upon ſmooth flat ſtones, in order to poliſh their broad-ſides. This is a very dexterous operation, and is a remarkable inſtance of what may be effected by the power of habit and long practice; for theſe boys, in turning up the other ſide of the type, do it ſo quickly by a mere touch of the fingers of the left hand, as not to require the leaſt perceptible intermiſſion in the motion of the right hand upon the ſtone. The types, thus finely ſmoothed and flattened on the broad-ſides, are next carried to another ſet of boys, who ſit at a ſquare table, two on each ſide, and there are ranged up on long rulers or ſticks, fitted with a ſmall projection, to hinder them from ſliding off backwards. When theſe ſticks are ſo filled, they are placed, two and two, upon a ſet of wooden pins fixed into the wall, near the dreſſer, ſometimes to the amount of an hundred, in order to undergo the finiſhing operations. This workman, who is always the moſt expert and ſkilful in all the different branches carried on at the foundery, begins by taking one of theſe ſticks, and, with a peculiar addreſs, ſlides the whole column of types off upon the dreſſing-ſtick: this is made of well-ſeaſoned mahogany, and furniſhed with two end-pieces of ſteel, a little lower than the body of the types, one of which is moveable, ſo as to approach the other by means of a long ſcrew-pin, inſerted in the end of the ſtick. The types are put into this ſtick with their faces next to the back or projection; and after they are adjuſted to one another ſo as to ſtand even, they are then bound up, by ſcrewing home the moveable end-piece. It is here where the great

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Foundery.

great and requiſite accuracy of the moulds comes to be perceived; for in this caſe the whole column, ſo bound up, lies flat and true upon the ſtick, the two extreme types being quite parallel, and the whole has the appearance of one ſolid continuous plate of metal. The leaſt inaccuracy in the exact parallelism of the individual type, when multiplied ſo many times, would render it impoſſible to bind them up in this manner, by diſpoſing them to riſe or ſpring from the ſtick by the ſmalleſt preſſure from the ſcrew. Now, when lying ſo conveniently with the narrow edges uppermoſt, which cannot poſſibly be ſmoothed in the manner before mentioned by the ſtones, the workman does this more effectually by ſcraping the ſurface of the column with a thick-edged but ſharp razor, which at every ſtroke brings on a very fine ſmooth ſkin, like to poliſhed ſilver; and thus he proceeds till in about half a minute he comes to the farther end of the ſtick. The other edges of the types are next turned upwards, and poliſhed in the ſame manner. It is whilſt the types thus lie in the dreſſing-ſtick that the operation of bearding or barbing is performed, which is effected by running a plane, faced with ſteel, along the ſhoulder of the body next to the face, which takes more or leſs off the corner, as occaſion may require. Whilſt in the dreſſing-ſtick they are alſo grooved, which is a very material operation. In order to underſtand this, it muſt be remembered, that when the types are firſt broken off from the jets, ſome ſuperfluous metal always remains, which would make them bear very unequally againſt the paper whilſt under the printing-preſs, and effectually mar the impreſſion. That all theſe inequalities may, therefore, be taken away, and that the bearings of every type may be regulated by the ſhoulders imparted to them all alike from the mould, the workman or dreſſer proceeds in the following manner. The types being ſcrewed up in the ſtick, as before mentioned, with the jet-end outermoſt, and projecting beyond the wood about one-eighth of an inch, the ſtick is put into an open preſs, ſo as to preſent the jet-end uppermoſt, and then every thing is made faſt by driving a long wedge, which bears upon a ſlip of wood, which lies cloſe to the types the whole length: then a plough or plane is applied, which is ſo conſtructed as to embrace the projecting part of the types betwixt its long ſides, which are made of poliſhed iron. When the plane is thus applied, the ſteel cutter bearing upon that part between the ſhoulders of the types, where the inequalities lie, the dreſſer dexterouſly glides it along, and by this means ſtrips off every irregular part that comes in the way, and ſo makes an uniform groove the whole length, and leaves the two ſhoulders ſtanding; by which means every type becomes preciſely like to another, as to the height againſt paper. The types being now finiſhed, the ſtick is taken out of the preſs, and the whole column replaced upon the other ſtick; and after the whole are ſo dreſſed, he proceeds to pick out the bad letters, previous to putting them up into pages and papers. In doing this he takes the ſtick into his left hand, and turning the faces near to the light, he examines them carefully, and whenever an imperfect or damaged letter occurs, he nimbly plucks it out with a ſharp bodkin, which he holds in the right hand for that purpoſe. Thoſe letters which, from their form, project over the body of the type, and which cannot on this account be rubbed on the ſtones, are ſcraped on the broad-ſides with a knife or file, and ſome of the metal next the face pared away with a penknife, in order to allow the type to come cloſe to any other. This operation is called *kerning*.

Fount, Fountain.

The excellence of printing types conſiſts not only in the due performance of all the operations above deſcribed, but alſo in the hardneſs of the metal, form, and fine proportion of the character, and in the exact bearing and ranging of the letters in relation to one another.

FOUNT, or FONT, among printers, &c. a ſet or quantity of characters or letters of each kind, caſt by a letter-founder, and ſorted.—We ſay, a founder has caſt a fount of pica, of engliſh, of pearl, &c. meaning that he has caſt a ſet of characters of theſe kinds.

A complete fount does not only include the running letters, but alſo large and ſmall capitals, ſingle letters, double letters, points, commas, lines, and numeral characters.

Founts are large or ſmall, according to the demand of the printer, who orders them by the hundred weight, or by ſheets. When the printer orders a fount of 500, he means that the fount ſhould weigh 500 lb. When he demands a fount of 10 ſheets, it is underſtood, that with that fount he ſhall be able to compoſe 10 ſheets, or 20 forms, without being obliged to diſtribute. The founder takes his meaſures accordingly; he reckons 120 pounds for a ſheet, including the quadrates, &c. or 60 pounds for a form, which is half a ſheet: not that the ſheet always weighs 120 pounds, or the form 60 pounds; on the contrary, it varies according to the ſize of the form; beſides, it is always ſuppoſed that there are letters left in the caſes.

The letter-founders have a kind of liſt, or tariff, whereby they regulate their founts: the occaſion thereof is, that ſome letters being in much more uſe, and oftener repeated than others, their cells or caſes, ſhould be better filled and ſtored than thoſe of the letters which do not return ſo frequently. Thus the *o* and *i*, for inſtance, are always in greater quantity than the *k* or *z*.

This difference will be beſt perceived from a proportional compariſon of thoſe letters with themſelves, or ſome others. Suppoſe a fount of 100,000 characters, which is a common fount; here the *a* ſhould have 5000, the *c* 3000, the *e* 11,000, the *i* 6000, the *m* 3000, the *k* only 30, and the *w*, *y*, and *z*, not many more. But this is only to be underſtood of the letters of the lower caſe; thoſe of the upper having other proportions, which it would be, here, too long to inſiſt on.

FOUNTAIN, a ſpring or ſource of water riſing out of the earth. Among the ancients, fountains were generally eſteemed as ſacred; but ſome were held to be ſo in a more particular manner. The good effects received from cold baths gave ſprings and rivers this high reputation; for the ſalutary influence was ſuppoſed to proceed from ſome preſiding deity. Particular reaſons might occaſion ſome to be held in greater veneration than others. It was cuſtomary to throw little pieces of money into thoſe ſprings, lakes, or rivers, which were eſteemed ſacred, to render the preſiding divinities propitious; as the touch of a naked bo-

dy

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Fountain. dy was ſuppoſed to pollute their hallowed waters. For the phenomena, theory, and origin, of fountains or ſprings, ſee SPRING.

Artificial FOUNTAIN, called alſo a *jet d'eau*, is a contrivance by which water is violently ſpouted upwards. See HYDRAULICS.

Boiling FOUNTAIN. See ICELAND.

FOUNTAIN-*Tree*, a very extraordinary vegetable growing in one of the Canary iſlands, and likewiſe ſaid to exiſt in ſome other places, which diſtils water from its leaves in ſuch plenty as to anſwer all the purpoſes of the inhabitants who live near it. Of this tree we have the following account in Glaſſe's hiſtory of the Canary iſlands.—"There are only three fountains of water in the whole iſland of Hierro, wherein the fountain-tree grows. One of theſe fountains is called *Acoſ*, which, in the language of the ancient inhabitants, ſignifies *river*; a name, however, which does not ſeem to have been given it on account of its yielding much water, for in that reſpect it hardly deſerves the name of a fountain. More to the northward is another called *Hapio*; and in the middle of the iſland is a ſpring, yielding a ſtream about the thickneſs of a man's finger. This laſt was diſcovered in the year 1565, and is called the *fountain of Anton. Hernandez*. On account of the ſcarcity of water, the ſheep, goats, and ſwine, here do not drink in the ſummer, but are taught to dig up the roots of fern, and chew them to quench their thirſt. The great cattle are watered at thoſe fountains, and at a place where water diſtils from the leaves of a tree. Many writers have made mention of this famous tree, ſome in ſuch a manner as to make it appear miraculous: others again deny the exiſtence of any ſuch tree; among whom is Father Feyjoo, a modern Spaniſh author, in his Theatro Critico. But he, and thoſe who agree with him in this matter, are as much miſtaken as thoſe who would make it appear to be miraculous. This is the only iſland of all the Canaries which I have not been in; but I have ſailed with natives of Hierro, who, when queſtioned about the exiſtence of this tree, anſwered in the affirmative.

"The author of the *Hiſtory of the diſcovery and conqueſt* has given us a particular account of it, which I ſhall here relate at large.

'The diſtrict in which this tree ſtands is called *Tigulahe*; near to which, and in the cliff or ſteep rocky aſcent that ſurrounds the whole iſland, is a narrow gutter or gulley, which commences at the ſea, and continues to the ſummit of the cliff, where it joins or coincides with a valley, which is terminated by the ſteep front of a rock. On the top of this rock grows a tree, called in the language of the ancient inhabitants, *Garſe*, "Sacred or Holy Tree," which for many years has been preſerved ſound, entire, and freſh. Its leaves conſtantly diſtil ſuch a quantity of water as is ſufficient to furniſh drink to every living creature in Hierro; nature having provided this remedy for the drought of the iſland. It is ſituated about a league and a half from the ſea. Nobody knows of what ſpecies it is, only that it is called *Til*. It is diſtinct from other trees, and ſtands by itſelf; the circumference of the trunk is about 12 ſpans, the diameter four, and in height from the ground to the top of the higheſt branch, 40 ſpans: the circumference of all the branches together is 120 feet. The branches are thick and extended; the loweſt commence about the height of an ell from the ground. Its fruit reſembles the acorn, and taſtes ſomething like the kernel of a pine-apple, but is ſofter and more aromatic. The leaves of this tree reſemble thoſe of the laurel, but are larger, wider, and more curved; they come forth in a perpetual ſucceſſion, ſo that the tree always remains green. Near to it grows a thorn which faſtens on many of its branches, and interweaves with them; and at a ſmall diſtance from the garſe are ſome beech-trees, breſos, and thorns. On the north ſide of the trunk are two large tanks or ciſterns, of rough ſtone, or rather one ciſtern divided, each half being 20 feet ſquare, and 16 ſpans in depth. One of theſe contains water for the drinking of the inhabitants; and the other that which they uſe for their cattle, waſhing, and ſuch-like purpoſes. Every morning, near this part of the iſland, a cloud or miſt ariſes from the ſea, which the ſouth and eaſterly winds force againſt the fore-mentioned ſteep cliff; ſo that the cloud having no vent but by the gutter, gradually aſcends it, and from thence advances ſlowly to the extremity of the valley, whence it is ſtopped and checked by the front of the rock which terminates the valley, and then reſts upon the thick leaves and wide-ſpreading branches of the tree, from whence it diſtils in drops during the remainder of the day, until it is at length exhauſted, in the ſame manner that we ſee water drip from the leaves of trees after a heavy ſhower of rain. This diſtillation is not peculiar to the garſe or til; for the breſos, which grow near it, likewiſe drop water; but their leaves being but few and narrow, the quantity is ſo trifling, that though the natives ſave ſome of it, yet they make little or no account of any but what diſtils from the til, which, together with the water of ſome fountains, and what is ſaved in the winter ſeaſon, is ſufficient to ſerve them and their flocks. This tree yields moſt water in thoſe years when the Levant or eaſterly winds have prevailed for a continuance; for, by theſe winds only the clouds or miſts are drawn hither from the ſea. A perſon lives on the ſpot near which this tree grows, who is appointed by the council to take care of it and its water; and is allowed a houſe to live in, with a certain ſalary. He every day diſtributes to each family of the diſtrict ſeven pots or veſſels full of water, beſides what he gives to the principal people of the iſland.'

"Whether the tree which yields water at this preſent time be the ſame as that mentioned in the above deſcription, I cannot pretend to determine: but it is probable there has been a ſucceſſion of them; for Pliny, deſcribing the Fortunate iſland, ſays, 'In the mountains of Ombrion are trees reſembling the plant ferula, from which water may be procured by preſſure. What comes from the black kind is bitter, but that which the white yields is ſweet and potable."

Trees yielding water are not peculiar to the iſland of Hierro; for travellers inform us of one of the ſame kind on the iſland of St Thomas, in the bight or gulph of Guiney. In Cockburn's voyages we find the following account of a dropping tree, near the mountains of Fera Paz, in America.

"On the morning of the fourth day, we came out on a large plain, where were great numbers of fine deer, and in the middle ſtood a tree of unuſual ſize, ſpreading its branches over a vaſt compaſs of ground.

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Fountain ‖ Fourmont.

Curiosity led us up to it. We had perceived, at some distance off, the ground about it to be wet; at which we began to be somewhat surprised, as well knowing there had no rain fallen for near six months past, according to the certain course of the season in that latitude: that it was impossible to be occasioned by the fall of dew on the tree, we were convinced, by the sun's having power to exhale away all moisture of that nature a few minutes after its rising. At last, to our great amazement as well as joy, we saw water dropping, or as it were distilling, fast from the end of every leaf of this wonderful (nor had it been amiss if I had said *miraculous*) tree; at least it was so with respect to us, who had been labouring four days through extreme heat, without receiving the least moisture, and were now almost expiring for the want of it.

"We could not help looking on this as liquor sent from heaven to comfort us under great extremity. We catched what we could of it in our hands, and drank very plentifully of it; and liked it so well, that we could hardly prevail with ourselves to give over. A matter of this nature could not but incite us to make the strictest observations concerning it; and accordingly we staid under the tree near three hours, and found we could not fathom its body in five times. We observed the soil where it grew to be very strong; and upon the nicest inquiry we could afterwards make, both of the natives of the country and the Spanish inhabitants, we could not learn there was any such tree known throughout New Spain, nor perhaps all America over: but I do not relate this as a prodigy in nature, because I am not philosopher enough to ascribe any natural cause for it; the learned may perhaps give substantial reasons in nature for what appeared to us a great and marvellous secret."

FOUQUIERES (James), an eminent painter, was born at Antwerp in 1580, and received his chief instructions from Velvet Brughel. He applied himself to the study of landscapes, and went to Italy to improve himself in colouring; and succeeded so happily, that his works are said to be nearly equal to those of Titian.—He was engaged and much caressed at the court of the elector Palatine, and afterwards spent several years of his life in France; where his works met with universal approbation, and he was proportionably well paid for his paintings. Yet by some misconduct he sunk into poverty, and died in the house of an inconsiderable painter in 1659. He had resided for several years at Rome and Venice, where he acquired that excellent style of colouring and design for which he is so deservedly distinguished.

FOURCHEE, or FOURCHY, in heraldry, an appellation given to a cross forked at the ends. See HERALDRY.

FOURMONT (Stephen), professor of the Arabic and Chinese languages, and one of the most learned men of his time, was born at Herbelai, a village four leagues from Paris, in 1683. He studied in Mazarine college, and afterwards in the Seminary of Thirty-three. He was at length professor of Arabic in the Royal College, and was made a member of the Academy of Inscriptions. In 1738 he was chosen a member of the Royal Society in London, and of that of Berlin in 1741. He was often consulted by the duke of Orleans, first prince of the blood; who had a particular esteem for him, and made him one of his secretaries. He wrote a great number of books; the most considerable of those which have been printed are, 1. The Roots of the Latin Tongue, in verse. 2. Critical Reflections on the Histories of ancient Nations, 2 vols 4to. 3. *Meditationes Sinicæ*, folio. 4. A Chinese Grammar, in Latin, folio. 5. Several Dissertations printed in the Memoirs of the Academy of Inscriptions, &c. He died at Paris in 1745.

Fourneſs.

He ought not to be confounded with *Michael Fourmont*, his youngest brother; who took orders, was professor of the Syriac language in the Royal College, and a member of the Academy of Inscriptions. He died in 1746.

FOURNESS, in Loynsdale, Lancashire, is a track, between the Kent, Leven, and Dudden-Sands, which runs north parallel with the west sides of Cumberland and Westmoreland; and on the south runs out into the sea as a promontory. Here, as Mr Camden expresses it, "the sea, as if enraged at it, lashes it more furiously, and in high tides has even devoured the shore, and made three large bays; *viz* Kentsand, into which the river Ken empties itself; Levensand and Duddensand, between which the land projects in such a manner that it has its name thence; Foreness and Foreland, signifying the same with us as *promontorium anterius* in Latin." Bishop Gibson, however, derives the name of *Fourneſs*, or *Furneſs*, from the numerous furnaces that were there anciently, the rents and services of which (called *bloomsmithy rents*) are still paid. This whole tract, except on the coast, rises in high hills and vast piles of rocks called *Fornеſs-Fells*; among which the Britans found a secure retreat, trusting to these natural fortresses, though nothing was inaccessible to the victorious Saxons: for we find the Britans settled here 228 years after the arrival of the Saxons; because at that time Egfrid king of Northumberland gave St Cuthbert the land called *Carlhmell*, and all the Britans in it, as is related in his life. In these mountainous parts are found quarries of a fine durable blue slate to cover buildings with, which are made use of in many other parts of the kingdom. Here are several cotton mills lately erected; and if fuel for fire were more plentiful, the trade of this country would much increase: but there being no coals nearer than Wigan or Whitehaven, and the coast-duties high, firing is rather scarce, the country people using only turf or peat, and that begins to be more scarce than formerly. In the mosses of Fourness much fir is found, but more oak: the trunks in general lie with their heads to the east, the high winds having been from the west. High Fourness has ever had great quantities of sheep, which browse upon the hollies left in great numbers for them; and produces charcoal for melting iron-ore, and oak-bark for tanners use, in great abundance. The forests abounded with deer and wild boars, and the *legh* or *scose*, or large stags, whose horns are frequently found underground here. The low or plain part of Fourness, which is so called to distinguish it from the woody or mountainous part, produces all sorts of grain, but principally oats, whereof the bread eaten in this country is generally made; and there are found here veins of a very rich iron-ore, which is not only melted and wrought here, but great quantities are exported to other parts to mix with poorer ores. The three sands

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Fourneſs || Fowey.

above mentioned are very dangerous to travellers by the tides and the many quickſands. There is a guide on horſeback appointed to Kent or Lancaſter ſand at 10 l. *per ann.* to Leven at 6 l. *per ann.* out of the public revenue; but to Dudden, which are moſt dangerous, none; and it is no uncommon thing for perſons to paſs over in parties of 100 at a time like caravans, under the direction of the carriers, who go to or fro every day. The ſands are leſs dangerous than formerly, being more uſed and better known, and travellers never going without the carriers or guides. "Furnis abbey up in the mountains," was begun at Tulket in Amounderneſs 1124, by Stephen earl of Boulogne, afterwards king of England, for the monks of Savigni in France, and three years after removed to this valley, then called *Bekangeſgill*, or "the vale of nightſhade." It was of the Ciſtertian order, endowed with above 800 l. *per ann.* Out of the monks of this abbey, Mr Camden informs us, the biſhops of the Iſle of Man, which lies overagainſt it, uſed to be choſen by ancient cuſtom; it being as it were the mother of many monaſteries in Man and Ireland. Some ruins, and part of the foſſe which ſurrounded the monaſtery, are ſtill to be ſeen at Tulket. The remains at Fourneſs breathe that plain ſimplicity of the Ciſtertian abbeys; the chapter-houſe was the only piece of elegant Gothic about it, and its roof has lately fallen in. Part of the painted glaſs from the eaſt window, repreſenting the crucifixion, &c. is preſerved at Winder-mere church in Bowlneſs, Weſtmoreland. The church (except the north ſide of the nave), the chapter-houſe, refectory, &c. remain, only unroofed.

FOURTH REDUNDANT, in muſic. See INTERVAL.

FOWEY, or FOY, a town of Cornwall in England, 240 miles from London, with a commodious haven on the Channel. It is a populous place, extending above one mile on the eaſt ſide of a river of its own name; and has a great ſhare in the fiſhing trade, eſpecially pilchards. It roſe ſo much formerly by naval wars and piracies, that in the reign of Edward III. its ſhips refuſing to ſtrike when required as they ſailed by Rye and Winchelſea, were attacked by the ſhips of thoſe ports, but defeated them; whereupon they bore their arms mixed with the arms of thoſe two cinque-ports, which gave riſe to the name of the "Gallants of Fowey." And we learn from Camden, that this town quartered a part of the arms of every one of the cinque-ports with their own; intimating, that they had at times triumphed over them all: and indeed once they were ſo powerful, that they took ſeveral of the French men of war. In the reign of Edward III. they reſcued certain ſhips of Rye from diſtreſs, for which this town was made a member of the cinque-ports. Edward IV. favoured Fowey ſo much, that when the French threatened to come up the river to burn it, he cauſed two towers, the ruins of which are yet viſible, to be built at the public charge for its ſecurity: but he was afterwards ſo diſguſted with the inhabitants for attacking the French after a truce proclaimed with Louis XI. that he took away all their ſhips and naval ſtores, together with a chain drawn acroſs the river between the two forts above mentioned, which was carried to Dartmouth. It is ſaid they were ſo inſolent, that they cut off the ears of the king's purſuivants; for which ſome lives were forfeited as well as eſtates. The corporation conſiſts of a mayor, recorder, 8 aldermen, a town-clerk, and 2 aſſiſtants. The market is Saturday, the fairs May-day and Sept. 10. Here are a fine old church, a free-ſchool, and an hoſpital. The toll of the market and fairs, and keyage of the harbour, were veſted in the corporation on the payment of a fee-farm rent of about 40 s. It does not appear to have ſent members to parliament before the 13th of Queen Elizabeth. Here is a coinage for the tin; of which a great quantity is dug in the country to the north and weſt of it. The river Foy, or Foath, is very broad and deep here, and was formerly navigable as high as Leſtwithiel. W. Long. 5°. N. Lat. 50. 27.

Fowey || Foy.

FOWL, among zoologiſts, denotes the larger ſorts of birds, whether domeſtic or wild: ſuch as geeſe, pheaſants, partridges, turkey, ducks, &c.

Tame fowl make a neceſſary part of the ſtock of a country farm. See the article POULTRY.

Fowls are again diſtinguiſhed into two kinds, *viz. land* and *water* fowl, theſe laſt being ſo called from their living much in and about water: alſo into thoſe which are accounted *game*, and thoſe which are not. See the article GAME.

FOWLING, the art of catching birds by means of bird-lime, decoys, and other devices, or the killing of them by the gun. See *BIRD-Catching*, *BIRD-Lime*, DECOY, SHOOTING, and the names of the different birds in the order of the alphabet.

FOWLING, is alſo uſed for the purſuing and taking birds with hawks, more properly called FALCONRY or HAWKING. See theſe articles.

FOWLING-Piece, a light gun for ſhooting birds. That piece is always reckoned beſt which has the longeſt barrel, from 5½ to 6 feet, with a moderate bore; though every fowler ſhould have them of different ſizes, ſuitable to the game he deſigns to kill. The barrel ſhould be well poliſhed and ſmooth within, and the bore of an equal bigneſs from one end to the other; which may be proved, by putting in a piece of paſteboard, cut of the exact roundneſs of the top: for if this goes down without ſtops or ſlipping, you may conclude the bore good. The bridge-pan muſt be ſomewhat above the touch-hole, and ought to have a notch to let down a little powder: this will prevent the piece from recoiling, which it would otherwiſe be apt to do. As to the locks, chooſe ſuch as are well filed with true work, whoſe ſprings muſt be neither too ſtrong nor too weak. The hammer ought to be well hardened, and pliable to go down to the pan with a quick motion.

FOX, in zoology. See CANIS.

The fox is a great nuiſance to the huſbandman, by taking away and deſtroying his lambs, geeſe, poultry, &c. The common way to catch him is by gins; which being baited, and a train made by drawing raw fleſh acroſs in his uſual paths or haunts to the gin, it proves an inducement to bring him to the place of deſtruction.

The fox is alſo a beaſt of chace, and is taken with grehounds, tarriers, &c. See the article HUNTING.

Fox (John), the martyrologiſt, was born at Boſton in Lincolnſhire in the year 1517. At the age of 16 he was entered a ſtudent of Brazen-noſe college in Oxford; and in 1543 he proceeded maſter of arts, and was choſen fellow of Magdalen college. He diſcovered an early genius for poetry, and wrote ſeveral Latin comedies,

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Fox. the ſubjects taken from ſcripture, which his ſon aſſures us were written in an elegant ſtyle. Forſaking the muſes, he now applied himſelf with uncommon aſſiduity to the ſtudy of divinity, particularly church-hiſtory; and, diſcovering a premature propenſity to the doctrine of reformation, he was expelled the college as an heretic. His diſtreſs on this occaſion was very great; but it was not long before he found an aſylum in the houſe of Sir Thomas Lucy of Warwickſhire, who employed him as a tutor to his children. Here he married the daughter of a citizen of Coventry. Sir Thomas's children being now grown up, after reſiding a ſhort time with his wife's father, he came to London; where finding no immediate means of ſubſiſtence, he was reduced to the utmoſt degree of want; but was at length (as his ſon relates) miraculouſly relieved in the following manner: As he was one day ſitting in St Paul's church, emaciated with hunger, a ſtranger accoſted him familiarly, and, bidding him be of good cheer, put a ſum of money into his hand; telling him at the ſame time, that in a few days new hopes were at hand. He was ſoon after taken into the family of the ducheſs of Richmond, as tutor to the earl of Surrey's children, who, when their father was ſent to the tower, were committed to her care. In this family he lived, at Ryegate in Surrey, during the latter part of the reign of Henry VIII. the entire reign of Edward VI. and part of that of queen Mary: but at length, perſecuted by his implacable enemy biſhop Gardiner, he was obliged to ſeek refuge abroad. Baſil in Switzerland was the place of his retreat, where he ſubſiſted by correcting the preſs. On the death of queen Mary he returned to England; where he was graciouſly received by his former pupil the duke of Norfolk, who retained him in his family as long as he lived, and bequeathed him a penſion at his death. Mr ſecretary Cecil alſo obtained for him the rectory of Shipton near Saliſbury; and we are aſſured that he might have had conſiderable church-preferment, had it not been for his unwillingneſs to ſubſcribe to the canons. He died in the year 1587, in the 70th year of his age; and was buried in the chancel of St Giles's, Cripplegate. He was a man of great induſtry, and conſiderable learning; a zealous, but not a violent reformer; a nonconformiſt, but not an enemy to the church of England. He left two ſons; one of which was bred a divine, the other a phyſician. He wrote many pieces: but his principal work is, the Acts and Monuments of the Church, &c. commonly called *Fox's Book of Martyrs*. His facts are not always to be depended on, and he often loſes his temper; which, conſidering the ſubject, is not much to be wondered at.

FOX (George), the founder of the ſect of Engliſh Quakers, was a ſhoemaker in Nottingham. The accounts of thoſe times tell us, that as he wrought at his trade, he uſed to meditate much on the ſcriptures: which, with his ſolitary courſe of life, improving his natural melancholy, he began at length to fancy himſelf inſpired; and in conſequence thereof ſet up for a preacher.

He propoſed but few articles of faith; inſiſting chiefly on moral virtue, mutual charity, the love of God, and a deep attention to the inward motions and ſecret operations of the ſpirit: he required a plain ſimple worſhip, and a religion without ceremonies, making it a principal point to wait in profound ſilence the directions of the Holy Spirit. Fox met with much rough treatment for his zeal, was often impriſoned, and ſeveral times in danger of being knocked on the head. But all diſcouragements notwithſtanding, his ſect prevailed much, and many conſiderable men were drawn over to them; among whom were Barclay and Penn. He died in 1681. His followers were called *Quakers*, in deriſion of ſome unuſual ſhakings and convulſions with which they were ſeized at their firſt meetings. See the article Quakers. Fox.

Fox-Glove, in botany. See Digitalis.

Fox-Iſlands, the name of a group of iſlands, 16 in number, ſituated between the eaſtern coaſt of Kamtſchatka and the weſtern coaſt of the continent of America. Each iſland has a particular name; but the general name *Fox-iſlands* is given to the whole group, on account of the great number of black, grey, and red foxes with which they abound. The dreſs of the inhabitants conſiſts of a cap and a fur coat, which reaches down to the knee. Some of them wear common caps of a party-coloured bird-ſkin, upon which they leave part of the wings and tail. On the fore-part of their hunting and fiſhing-caps, they place a ſmall board like a ſkreen, adorned with the jaw-bones of ſea-bears, and ornamented with glaſs-beads, which they receive in barter from the Ruſſians. At their feſtivals and dancing parties they uſe a much more ſhowy ſort of caps. They feed upon the fleſh of all ſorts of ſea-animals, and generally eat it raw. But if at any time they chooſe to dreſs their victuals, they make uſe of a hollow ſtone; having placed the fiſh or fleſh therein, they cover it with another, and cloſe the interſtices with lime or clay. They then lay it horizontally upon two ſtones, and light a fire under it. The proviſion intended for keeping is dried without ſalt in the open air. Their weapons conſiſt of bows, arrows, and darts; and for defence they uſe wooden ſhields.—The moſt perfect equality reigns among theſe iſlanders. They have neither chiefs nor ſuperiors, neither laws nor puniſhments. They live together in families, and ſocieties of ſeveral families united, which form what they call a *race*, who, in caſe of an attack or defence, mutually help and ſupport each other. The inhabitants of the ſame iſland always pretend to be of the ſame race; and every perſon looks upon his iſland as a poſſeſſion, the property of which is common to all the individuals of the ſame ſociety. Feaſts are very common among them, and more particularly when the inhabitants of one iſland are viſited by thoſe of the others. The men of the village meet their gueſts beating drums, and preceded by the women, who ſing and dance. At the concluſion of the dance, the hoſts ſerve up their beſt proviſions, and invite their gueſts to partake of the feaſt. They feed their children when very young with the coarſeſt fleſh, and for the moſt part raw. If an infant cries, the mother immediately carries it to the ſea-ſide, and whether it be ſummer or winter, holds it naked in the water until it is quiet. This cuſtom is ſo far from doing the children any harm, that it hardens them againſt the cold, and they accordingly go barefooted through the winter without the leaſt inconvenience. They ſeldom heat their dwellings; but when they are deſirous of warming themſelves, they light a bundle of hay, and ſtand

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Fracaſtor, Fraches.

over it; or elſe they ſet fire to train-oil, which they pour into a hollow ſtone. They have a good ſhare of plain natural ſenſe, but are rather ſlow of underſtanding. They ſeem cold and indifferent in moſt of their actions; but let an injury, or even a ſuſpicion only, rouſe them from this phlegmatic ſtate, and they become inflexible and furious, taking the moſt violent revenge without any regard to the conſequences. The leaſt affliction prompts them to ſuicide; the apprehenſion of even an uncertain evil often leads them to deſpair; and they put an end to their days with great apparent inſenſibility.

FRACASTOR (Jerome), a moſt eminent Italian poet and phyſician, was born at Verona in the year 1482. Two ſingularities are related of him in his infancy: one is, that his lips adhered ſo cloſely to each other when he came into the world, that a chirurgeon was obliged to divide them with his inciſion-knife; the other, that his mother was killed with lightning, while he, though in her arms at the very moment, eſcaped unhurt. Fracaſtor was of parts ſo exquiſite, and made ſo wonderful a progreſs in every thing he undertook, that he became eminently ſkilled not only in the belles lettres, but in all arts and ſciences. He was a poet, a philoſopher, a phyſician, an aſtronomer, a mathematician, and what not? He was a man of vaſt conſequence in his time; as appears from pope Paul III.'s making uſe of his authority to remove the council of Trent to Bologne, under the pretext of a contagious diſtemper, which, as Fracaſtor depoſed, made it no longer ſafe to continue at Trent. He was intimately acquainted with cardinal Bembus, Julius Scaliger, and all the great men of his time. He died of an apoplexy at Caſi near Verona, in 1553: and in 1559, the town of Verona erected a ſtatue in honour of him.

He was the author of many performances, both as a poet and as a phyſician; yet never man was more diſintereſted in both theſe capacities than he: evidently ſo as a phyſician, for he practiſed without fees; and as a poet, whoſe uſual reward is glory, nothing could be more indifferent. It is owing to this indifference, that we have ſo little of his poetry, in compariſon of what he wrote; and that, among other compoſitions, his Odes and Epigrams, which were read in manuſcript with infinite admiration, yet, never paſſing the preſs, were loſt. What we have now of his, are the three books of "Siphilis, or of the French diſeaſe;" a book of Miſcellaneous Poems; and two books of his poem, intitled, *Joſeph*, which he began at the latter end of his life, but did not live to finiſh. And theſe works, it is ſaid, would have periſhed with the reſt, if his friends had not taken care to preſerve and communicate copies of them: For Fracaſtor, writing merely for amuſement, never troubled himſelf in the leaſt about what became of his works after they once got out of his hands. Fracaſtor compoſed alſo a poem, called *Alcon ſive de cura canum venaticorum*. His poems as well as his other works are written all in Latin. His medical pieces are, *De Sympathia & Antipathia*,—*De contagione & contagioſis morbis*,—*De cauſis criticorum dierum*,—*De vini temperatura*, &c. His works have been printed ſeparately and collectively. The beſt edition of them is that of Padua 1735, in 2 vols 4to.

FRACHES, in the glaſs trade, are the flat iron pans into which the glaſs veſſels already formed are put when in the tower over the working furnace, and by means of which they are drawn out through the leers, that they may be taken gradually from the fire, and cool by degrees.

Fraction || Fragaria.

FRACTION, in arithmetic and algebra, a part or diviſion of an unit or integer; or a number which ſtands to an unit in the relation of a part to its whole. The word literally imports a broken number.

Fractions are uſually divided into decimal, ſexageſimal, and vulgar. See ALGEBRA and ARITHMETIC.

FRACTURE, in ſurgery, a rupture of a bone or a ſolution of continuity in a bone when it is cruſhed or broken by ſome external cauſe. See SURGERY.

FRÆNUM, or FRENUM, *Bridle*, in anatomy, a name given to divers ligaments, from their office in retaining and curbing the motions of the parts they are fitted to.

Frænum Linguæ, or *Bridle of the Tongue*; a membranous ligament, which ties the tongue to the os hyoides, larynx, fauces, and lower parts of the mouth. In ſome ſubjects the *frænum* runs the whole length of the tongue to the very tip; in which caſes, if it were not cut, it would take away all poſſibility of ſpeech. See *TONGUE-Tied*.

Frænum Penis, a ſlender ligament, whereby the prepuce is tied to the lower part of the glans of the penis. Nature varies in the make of this part; it being ſo ſhort in ſome, that unleſs divided it would not admit of perfect erection. There is alſo a kind of little *frænum*, faſtened to the lower part of the clitoris.

FRAGA, a ſtrong town with a handſome caſtle in the kingdom of Arragon in Spain. It is ſtrong by ſituation among the mountains; having the river Cinca before it, whoſe high banks are difficult of acceſs; and at its back a hill, which cannot eaſily be approached with large cannon. Alphonſo VII. king of Arragon, and the firſt of that name of Caſtile, was killed by the Moors in 1134, when he beſieged this town. E. Long. 0. 23. N. Lat. 41. 28.

FRAGARIA, the STRAWBERRY: A genus of the polygynia order, belonging to the icoſandria claſs of plants; and in the natural method ranking under the 35th order, *Senticoſæ*. The calyx is decemfid; the petals five; the receptacle of the ſeeds ovate, in the form of a berry, and deciduous. There is but one ſpecies, *viz.* the veſca, or cultivated ſtrawberry. The principal varieties are, 1. The ſylveſtris, or wood-ſtrawberry, with oval ſawed leaves, and ſmall round fruit. 2. The Virginian ſcarlet, or Virginia ſtrawberry, with oblong oval ſawed leaves, and a roundiſh ſcarlet-coloured fruit. 3. The moſchata, or hautboy, or muſky ſtrawberry, having oval, lanceolate, rough leaves, and large pale-red fruit. 4. The Chiloenſis, or Chili ſtrawberry, with large, oval, thick, hairy leaves, large flowers, and very large firm fruit. 5. The Alpina, Alpine, or monthly ſtrawberry, having ſmall oval leaves, ſmall flowers, and moderate-ſized, oblong, pointed fruit.

All theſe varieties are hardy, low, perennials, durable in root, but the leaves and fruit-ſtalks are renewed annually in ſpring. They flower in May and June, and their fruit comes to perfection in June, July, and Auguſt; the Alpine kind continuing till the beginning of winter. They all proſper in any common garden ſoil, producing abundant crops annually without

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Fraguier || Frame.

out much trouble. They increaſe exceedingly every ſummer, both by off-ſets or ſuckers from the ſides of the plants, and by the runners or ſtrings, all of which rooting and forming plants at every joint, each of which ſeparately planted bears a few fruit the following year, and bear in great perfection the ſecond ſummer. Thoſe of the Alpine kind will even bear fruit the ſame year that they are formed. All the ſorts are commonly cultivated in kitchen-gardens, in beds or borders of common earth, in rows lengthwiſe 15 or 18 inches diſtance; the plants the ſame diſtance from one another in each row. Patches of the different ſorts diſpoſed here and there in the fronts of the different compartments of the pleaſure-ground, will appear ornamental both in their flowers and fruit, and make an agreeable variety.

Strawberries, eaten either alone, or with ſugar and milk, are univerſally eſteemed a moſt delicious fruit. They are grateful, cooling, ſubacid, and juicy. Tho' taken in large quantities, they ſeldom diſagree. They promote perſpiration, impart a violet ſmell to the urine, and diſſolve the tartareous incruſtations on the teeth. People afflicted with the gout or ſtone have found relief by uſing them very largely; and Hoffman ſays, he has known conſumptive people cured by them. The bark of the root is aſtringent.—Sheep and goats eat the plant; cows are not fond of it; horſes and ſwine refuſe it.

FRAGUIER (Claude Francis), a polite and learned French writer, born at Paris, of a noble family, in 1666. He was educated under the Jeſuits, and was even admitted into the order, though he afterwards quitted it; and being thus at liberty to follow his inclinations, he ſoon after aſſiſted the Abbè Bignon in conducting the *Journal de Sçavans*, having all the qualifications for ſuch a work. His works conſiſt of Latin poems, and a great number of very excellent diſſertations. He died in 1728.

FRAIL, a baſket made of ruſhes or the like, in which are packed up figs, raiſins, &c. It ſignifies alſo a certain quantity of raiſins, about 75 pounds.

FRAISE, in fortification, a kind of defence, conſiſting of pointed ſtakes, ſix or ſeven feet long, driven parallel to the horizon into the retrenchments of a camp, a half-moon, or the like, to prevent any approach or ſcalade.

Fraiſes differ from paliſades chiefly in this, that the latter ſtand perpendicular to the horizon, and the former jet out parallel to the horizon, or nearly ſo, being uſually made a little ſloping, or with the points hanging down. Fraiſes are chiefly uſed in retrenchments and other works thrown up of earth; ſometimes they are found under the parapet of a rampart, ſerving inſtead of the cordon of ſtone uſed in ſtone-works.

To FRAISE *a Battalion*, is to line the muſqueteers round with pikes, that in caſe they ſhould be charged with a body of horſe, the pikes being preſented, may cover the muſqueteers from the ſhock, and ſerve as a barricade.

FRAME, in joinery, a kind of caſe, wherein a thing is ſet or incloſed, or even ſupported; as a window-frame, a picture-frame, &c.

FRAME is alſo a machine uſed in divers arts; as,

FRAME, among printers, is the ſtand which ſupports the caſes. See CASE.

FRAME, among founders, a kind of ledge incloſing a board; which, being filled with wetted ſand, ſerves as a mould to caſt their works in. See FOUNDERY.

Frame || France.

FRAME is more particularly uſed for a ſort of loom, whereon artificers ſtretch their linens, ſilks, ſtuffs, &c. to be embroidered, quilted, or the like.

FRAME, among painters, a kind of ſquare, conſiſting of four long ſlips of wood joined together, whoſe intermediate ſpace is divided by threads into ſeveral little ſquares like a net; and hence ſometimes called *reticula*. It ſerves to reduce figures from great to ſmall; or, on the contrary, to augment their ſize from ſmall to great.

FRAMLINGHAM, a town of Suſſex, 88 miles from London. It is a large old place, with a caſtle, ſuppoſed to have been built by ſome of the firſt kings of the Eaſt-Angles; the walls, yet ſtanding, are 44 feet high, 8 thick, with 13 towers 14 feet above them, 2 of which are watch-towers. To this caſtle the princeſs, afterwards Queen Mary I. retired, when the Lady Jane Grey was her competitor for the crown. The town is pleaſantly ſituated, though but indifferently built, upon a clay-hill, in a fruitful ſoil and a healthy air, near the ſource of the river Ore, by ſome called Wincknel, which runs through it to Orford. It has a ſpacious place for the market on Saturday; and a large ſtately church built all of black flint, with a ſteeple 100 feet high; two good almſhouſes; and a free-ſchool.

FRANC. See FRANK.

FRANCE, a large kingdom of Europe, ſituated between 5° W. and 7° E. Long. and between 43° and 51° N. Lat. being bounded by the Engliſh channel and the Auſtrian Netherlands on the north; by Germany, Switzerland, Savoy, and Piedmont, in Italy, on the eaſt; by the Mediterranean ſea, and the Pyrenean mountains, which ſeparate it from Spain, on the ſouth; and by the bay of Biſcay on the weſt.

The kingdom of France was originally poſſeſſed by the *Celtes* or *Gauls*. They were a very warlike people, and often checked the progreſs of the Roman arms: nor did they yield till the time of Julius Cæſar, who totally ſubdued their country, and reduced it to the form of a Roman province*. The Romans continued in quiet poſſeſſion of Gaul, as long as their empire retained its ſtrength, and they were in a condition to repreſs the incurſions of the German nations, whom even in the zenith of their power they had not been able to ſubdue. But in the reign of the emperor Valerian, the ancient Roman valour and diſcipline had begun to decline, and the ſame care was not taken to defend the provinces as formerly. The barbarous nations, therefore, began to make much more frequent incurſions; and among the reſt the *Franks*, a German nation, inhabiting the banks of the Rhine, proved particularly troubleſome. Their origin is variouſly accounted for; but the moſt probable ſuppoſition is, that about the time of the emperor Gordian, the people inhabiting the banks of the lower Rhine entered into a confederacy with thoſe who dwelt on the Weſer, and both together aſſumed the name of *Franks* or *Freeman*. Their firſt irruption, we are told by Valeſius, happened in the year 254, the ſecond of Valerian's reign. At this time they were but few in number; and were repulſed by Aurelian, afterwards emperor.

1 First ſubdued by Julius Cæſar.

* See *Gaul*.

2 Invaded by the Franks.

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France. Not discouraged by this check, they returned two years after in far greater numbers; but were again defeated by Gallienus, whom Valerian had chosen for his partner in the empire. Others, however, continued to pour in from their native country in such multitudes, that Gallienus, no longer able to drive them out by force of arms, made advantageous proposals to one of their chiefs, whom he engaged to defend the frontiers against his countrymen as well as other invaders.

This expedient did not long answer the purpose. In 260 the Franks, taking advantage of the defeat and captivity of Valerian in Persia, broke into Gaul, and afterwards into Italy, committing every where dreadful ravages. Five years afterwards they invaded Spain; which they possessed, or rather plundered, for the space of 12 years: nor could they be driven out of Gaul till the year 275, when the emperor Probus not only gave them a total overthrow in that country, but pursued them into their own, where he built several forts to keep them in awe. This intimidated them so much, that nine of their kings submitted to the emperor, and promised an annual tribute.—They continued quiet till the year 287; when, in conjunction with the Saxon pirates, they plundered the coasts of Gaul, carrying off an immense booty. To revenge this insult, the emperor Maximian entered the country of the Franks the following year, where he committed such ravages that two of their kings submitted to him; and to many of the common people who chose to remain in Gaul, he allowed lands in the neighbourhood of Treves and Cambray.

The restless disposition of the Franks, however, did not allow them to remain long in quiet. About the year 293, they made themselves masters of Batavia and part of Flanders; but were entirely defeated, and forced to surrender at discretion, by Constantius the father of Constantine the Great, who transplanted them into Gaul. Their countrymen in Germany continued quiet till the year 306, when they renewed their depredations; but being overcome by Constantine the Great, two of their kings were taken prisoners, and thrown to the wild beasts in the shows exhibited on that occasion.

All these victories, however, as well as many others said to have been gained by the Romans, were not sufficient to prevent the incursions of this restless and turbulent nation; insomuch that, in the year 355, they had made themselves masters of 40 cities in the province of Gaul. Soon after, they were totally defeated by the emperor Julian, and again by count Theodosius, father to the emperor of that name; but, in the year 388, they ravaged the province with more fury than ever, and cut off a whole Roman army that was sent against them. As the western empire was at this time in a very low state, they for some time found more interruption from other barbarians than from the Romans, till their progress was checked by Aetius.

3 Pharamond the first king. When the war with Aetius broke out, the Franks were governed by one *Pharamond*, the first of their kings of whom we have any distinct account. He is supposed to have reigned from the year 417 or 418, to 428; and is thought by archbishop Usher to have been killed in the war with Aetius. By some he is supposed to have compiled the Salic Laws, with the assistance of four sages named *Wisegast*, *Losegast*, *Widegast*, and *Solegast*. But Valesius is of opinion that the Franks had no written laws till the time of Clovis. Franks.

4 Clodio. Pharamond was succeeded by his son Clodio, who likewise carried on a war against the Romans. He is said to have received a terrible overthrow from Aetius near the city of Lens; notwithstanding which, he advanced to Cambray, and made himself master of that city, where for some time he took up his residence. After this he extended his conquests as far as the river Somme, and destroyed the cities of Treves and Cologne, Tournay and Amiens. He died in the year 448, and was succeeded by Merovæus.

5 Merovæus. Authors are not agreed whether the new king was brother, or son, or any relation at all, to Clodio. It seems probable indeed, that he was of a different family; as from him the first race of French kings were styled *Merovingian*. He was honoured and respected by his people, but did not greatly enlarge the boundaries of his kingdom. He died in 458.

6 Childeric. Merovæus was succeeded by his son Childeric; who being no longer kept in awe by Aetius, made war on the Romans, and extended his conquests as far as the river Loire. He is said to have taken the city of Paris after a siege of five years, according to some, and of ten, according to others. The Roman power was now totally destroyed in Italy; and therefore *Clodoveus*, *Clovis*, or *Louis*, for his name is differently written, who succeeded Childeric, set himself about making an entire conquest of Gaul. Part of the province was still retained by a Roman named *Syagrius*, who probably had become sovereign of the country on the downfal of the western empire in 476. He was defeated and taken prisoner by Clovis, who afterwards caused him to be beheaded, and soon after totally reduced his dominions.

7 French monarchy established by Clovis. Thus was the French monarchy established by Clovis in the year 487. He now possessed all the country lying between the Rhine and the Loire; which, though a very extensive dominion, was yet considerably inferior to what it is at present.

Clovis had been educated in the Pagan religion, and continued in that profession till the 30th year of his age; notwithstanding which he allowed his subjects full liberty of conscience. Having married, however, Clotilda, daughter of the duke of Burgundy, this princess, who was a zealous Christian, used all her influence with her husband to persuade him to embrace her religion. For some time he continued to waver; but happening to gain a battle, where, being in great danger, he had invoked the god of Clotilda and the Christians, he afterwards gave such a favourable ear to the discourses of Remigius bishop of Rheims, that he soon declared himself a convert, and was baptised in the year 496. His acknowledgment of the truths of the gospel was not followed by any amendment of life: on the contrary, he employed the remainder of his life in the aggrandisement of himself and extension of his dominions by the most abominable treachery, fraud, and violence. In his attacks on Armorica he proved unsuccessful. The inhabitants of this country, which comprehended the maritime part of ancient Gaul lying between the rivers Seine and Loire, had united for their defence; and though abandoned by the Romans,

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France. mans, made a powerful defence againſt the barbarians who aſſaulted them on all ſides. Clovis, finding them too powerful to be ſubdued by force, propoſed an union with his people, which they readily accepted, and this the more eaſily on account of his profeſſing the Chriſtain religion. Thus the Chriſtianity of Clovis in ſeveral inſtances proved ſubſervient to the purpoſes of his ambition, and his power became gradually very formidable. The Burgundians at this time poſſeſſed all the country from the foreſt of Voſges to the ſea of Marſeilles, under Gondebaud the uncle of Clotilda; who to ſecure his own authority, had put to death two of his brothers, one of whom was the father of the French queen. The third brother, *Godageſil*, whom he had ſpared and allowed to poſſeſs the principality of Geneva, conſpired with Clovis to drive him from his dominions. A war having commenced between the French and Burgundian monarchs, the latter was deſerted in a battle by Godageſil, and obliged to fly to Avignon, leaving his antagoniſt maſter of the cities of Lyons and Vienna. The victor next laid ſiege to Avignon; but it was defended with ſuch vigour, that Clovis at laſt thought proper to accept of a ſum of money and an annual tribute from Gondebaud; who was likewiſe obliged to cede to Godageſil the city of Vienne, and ſeveral other places taken during the war.

Gondebaud no ſooner found himſelf at liberty from his enemies, than he aſſembled a powerful army; with which he advanced towards Vienne, where Godageſil himſelf reſided at that time. The place was garriſoned by 5000 Franks, and might have made conſiderable reſiſtance; but Gondebaud being admitted through the ſubterraneous paſſage of an aqueduct, maſſacred moſt of the Franks, ſent the reſt priſoners to the king of the Viſigoths, and put Godageſil to death. This was quickly followed by the ſubmiſſion of all the other places which had owned the authority of Godageſil: and Gondebaud, now thinking himſelf able to reſiſt the power of Clovis, ſent a meſſage to inform him, that he muſt no longer expect the promiſed tribute; and though Clovis was very much mortified with this defection, he found himſelf obliged for the preſent to put up with the injury, and accept of the alliance and military ſervice of the king of Burgundy.

His next expedition was againſt the Viſigoths, who poſſeſſed conſiderable territories on both ſides of the Pyrenean mountains. His motives for this undertaking were expreſſed in the following ſpeech to his nobility when aſſembled in the city of Paris, which he conſidered as the capital of his dominions. "It is with concern (ſaid the religious monarch) that I ſuffer the Arians to poſſeſs the moſt fertile part of Gaul; let us, with the aid of God, march againſt them; and having conquered them, annex their kingdom to our dominions." The nobility approved of the ſcheme; and Clovis marched againſt a prince for whom he had but lately profeſſed the greateſt regard, vowing to erect a church in honour of the holy apoſtles, if he ſucceeded in his enterpriſe. Alaric the king of the Viſigoths was a young man deſtitute of military experience, though perſonally brave. He did not therefore heſitate at engaging his antagoniſt; but, unable to contend with the veteran troops of Clovis, his army was utterly defeated on the banks of the Clain, 10 miles ſouth of Poictiers, in the year 507. Alaric, perceiving the ruin of his troops, ruſhed againſt Clovis in perſon, by whom he was killed, and the remainder of the army purſued for ſome time with great ſlaughter. After this victory the province of Aquitain ſubmitted, and Clovis eſtabliſhed his winter quarters at Bourdeaux. Tholouſe ſurrendered next ſpring; and the royal treaſures of the Viſigoths were tranſported to Paris. Angouleme was next reduced, and the city of Arles inveſted. But here the victorious career of Clovis was ſtopped by Theodoric king of the Oſtrogoths, who had overturned the dominion of Odoacer in Italy. He had married Abolfleda the ſiſter of Clovis, but had alſo given his own daughter in marriage to the king of the Viſigoths, and had endeavoured, as much as was in his power, to preſerve a good underſtanding between the two ſovereigns. Finding this impoſſible, however, and that no bounds could be ſet to the ambition of Clovis, he ſent one of his generals with a powerful army againſt him; by whom the French monarch was defeated with the loſs of 30,000 men. By this misfortune Clovis was obliged to raiſe the ſiege of Arles with precipitation: however, the Franks ſtill retained the greateſt part of their conqueſts, and the province of Aquitain was indiſſolubly annexed to their empire. France.

8 Is honoured with the title of *Roman Conſul*.

In 509, Clovis had the title of Roman conſul; by which means the people of Rome were inſenſibly led to pay a peculiar regard to the French monarchs: and Clovis was now ſuppoſed to be inveſted with a juſt title to all his conqueſts in whatever manner they had been acquired. He was ſolemnly inveſted with his new dignity in the church of St Martin in the city of Tours; after which he entered the cathedral clothed in a purple tunic and mantle, the badges of his office.

Clovis now proceeded to augment his power by the murder of his kinſmen the princes of the Merovingian race. Among thoſe who periſhed on this occaſion were Sigibert king of Cologne, with his ſon Cloderic, Cararic, another prince whoſe dominions have not been accurately pointed out by hiſtorians; Ranacaire, who governed the preſent dioceſe of Cambray; and Renomer king of the territory of Maine. All theſe murders, however, were expiated, according to the views of the clergy of thoſe times, by the great zeal he expreſſed in the cauſe of Chriſtianity, and his liberality to the church.

Clovis died in the year 511, after having reformed and publiſhed the Salic laws: a few lines of which, debarring women from inheriting any part of the Salic lands, have been extended ſo far as to deprive the females of the royal family of France of their right of ſucceſſion to the throne of that kingdom.

9 His dominions divided among his children.

Clovis was buried in the church of St Peter and St Paul, now Genevieve, in the city of Paris, where his tomb is ſtill to be ſeen. His dominions were divided among his four ſons. Thieri, or Theodoric, the eldeſt, had the eaſtern part of the empire; and, from his making the city of Metz his capital, is commonly called the *king of Metz*. Clodomir, the eldeſt ſon by Clotilda, had the kingdom of Orleans; Childebert, and Clotaire, who were both infants, had the kingdoms of Paris and Soiſſons, under the tutelage of their mother. The prudence of Clotida kept matters quiet in all the parts of the empire for eight years; but about

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France. about the year 520, a numerous fleet of Danes arrived at the mouth of the Meuse; and their king Cochiliac, having landed his forces, began to destroy the country with fire and sword. Against him Thieri sent his son Theodobert, who defeated the Danish army and navy, and killed their king, forcing the rest to retire with precipitation.

In 522, Hermanfroi king of Thuringia, having destroyed one of his brethren named *Berthaire*, and seized on his dominions, applied to Thieri for assistance against his other brother Balderic, whom he intended to treat in the same manner. In this infamous enterprise Thieri embarked, on condition that he should have one half of Balderic's dominions; but after the unhappy prince was overcome and killed in battle, Hermanfroi seized all his dominions. Thieri had no opportunity of revenging himself till the year 531; when perceiving the power of the Ostrogoths, whom he much dreaded, to be considerably lessened by the death of king Theodric, he engaged his brother Clotaire to assist him; and they accordingly entered Thuringia with two powerful armies. They joined their forces as soon as they had passed the Rhine, and were quickly after reinforced by a considerable body of troops under the command of Theodobert. The allies attacked the army of Hermanfroi, which was advantageously posted; and having totally defeated it, he was forced to fly from place to place in disguise. Soon after this the capital was taken, and Hermanfroi himself being invited to a conference by Thieri, was treacherously murdered; after which his extensive dominions became feudatory to Thieri.

In the mean time, Clotilda had excited her children to make war on the Burgundians, in order to revenge the death of her father Chilperic, whom Gondebaud king of Burgundy had caused to be murdered. Gondebaud was now dead, and had left his dominions to his sons Sigismund and Godemar. Sigismund's forces were quickly defeated; and he himself was soon after delivered up by his own subjects to Clodomir, who caused him to be thrown into a pit, where he perished miserably. By his death Godemar became sole master of Burgundy. Clodomir marched against him, and defeated him; but pursuing his victory too eagerly, was surrounded by his enemies and slain. After the reduction of Thuringia, however, Childebert and Clotaire entered the kingdom of Burgundy at the head of a powerful army, and in 534 completed the conquest of it; in which, according to some, Godemar was killed; according to others, he retired into Spain, and from thence into Africa.

10 Clotaire becomes sole monarch.

In 560 Clotaire became sole monarch of France. He had murdered the sons of Clodomir, who was killed in Burgundy as above related. Thieri and his children were dead, as was also Childebert; so that Clotaire was sole heir to all the dominions of Clovis. He had five sons; and the eldest of them, named *Chramnes*, had some time before rebelled against his father in Auvergne. As long as Childebert lived, he supported the young prince; but on his death, Chramnes was obliged to implore his father's clemency. He was at this time pardoned; but he soon began to cabal afresh, and engaged the count of Bretagne to assist him in another rebellion. The Bretons, however, were defeated, and Chramnes determined to make his escape; but perceiving that his wife and children were surrounded by his father's troops, he attempted to rescue them. In this attempt he was taken prisoner, and with his family was thrust into a thatched cottage near the field of battle; of which the king was no sooner informed, than he commanded the cottage to be set on fire, and all that were in it perished in the flames.

11 Clotaire did not long survive this cruel execution of his son, but died in 562; and after his death the French empire was divided among his four remaining sons, Caribert, Gontran, Sigebert, and Chilperic. The old king made no division of his dominions before he died, which perhaps caused the young princes to fall out sooner than they would otherwise have done. After his death, however, they divided the kingdom by lot; when Caribert, the eldest, had the kingdom of Paris; Gontran, the second, had Orleans; Sigibert had Metz (or the kingdom of Austrasia); and Chilperic had Soissons. Provence and Aquitaine were possessed by all of them in common. The peace of the empire was first disturbed in 563 by an invasion of the Abares; a barbarous nation, said to be the remains of the Hunns. They entered Thuringia, which belonged to the dominions of Sigebert; but by him they were totally defeated, and obliged to repass the Elbe with precipitation. Sigebert pursued them close, but readily concluded a peace with them on their first proposals. To this he was induced, by hearing that his brother Chilperic had invaded his dominions, and taken Rheims and some other places in the neighbourhood. Against him, therefore, Sigebert marched with his victorious army, made himself master of Soissons his capital, and of the person of his eldest son Theodobert. He then defeated Chilperic in battle; and not only recovered the place which he had seized, but conquered the greater part of his dominions: nevertheless, on the mediation of the other two brothers, Sigebert abandoned all his conquests, set Theodobert at liberty, and thus restored peace to the empire.

Soon after this, Sigebert married Brunehaut daughter to Athanagilde king of the Visigoths in Spain; and in a little time after the marriage, died Caribert king of Paris, whose dominions were divided among his three brethren. In 567 Chilperic married Galswintha, Brunehaut's eldest sister, whom he did not obtain without some difficulty. Before her arrival, he dismissed his mistress called *Fredegonde*; a woman of great abilities and firmness of mind, but ambitious to the highest degree, and capable of committing the blackest crimes in order to gratify her ambition. The queen, who brought with her immense treasures from Spain, and made it her whole study to please the king, was for some time entirely acceptable. By degrees, however, Chilperic suffered Fredegonde to appear again at court, and was suspected of having renewed his intercourse with her; which gave such umbrage to the queen, that she desired leave to return to her own country, promising to leave behind her all the wealth she had brought. The king, knowing that this would render him extremely odious, found means to dissipate his wife's suspicions, and soon after caused her to be privately strangled, upon which he publicly married Fredegonde.

Such an atrocious action could not fail of exciting the greatest indignation against Chilperic. His dominions

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France. tions were immediately invaded by Sigebert and Gontran, who conquered the greateſt part of them; after which they ſuddenly made peace, Chilperic conſenting that Brunehaut ſhould enjoy thoſe places which on his marriage he had beſtowed upon Galſwintha, viz. Bourdeaux, Limoges, Cahors, Bigorre, and the town of Bearn, now called *Leſcar*.

The French princes, however, did not long continue at peace among themſelves. A war quickly enſued, in which Gontran and Chilperic allied themſelves againſt Sigebert. The latter prevailed; and having forced Gontran to a ſeparate peace, ſeemed determined
13 to make Chilperic pay dear for his repeated perfidy and
Sigebert aſſaſſinated; infamous conduct; when he was aſſaſſinated by a contrivance of Fredegonde, who thus ſaved herſelf and Chilperic from the moſt imminent danger. Immediately on his death, Brunehaut fell into the hands of Chilperic; but Gondebaud, one of Sigebert's beſt generals, made his eſcape into Auſtraſia with Childebert, the only ſon of Sigebert, an infant of about five years of age, who was immediately proclaimed king in room of his father. In a ſhort time, however, Meroveus, eldeſt ſon to Chilperic, fell in love with Brunehaut, and married her without acquainting his father. Chilperic, on this news, immediately went to Rouen, where Meroveus and his conſort were; and having ſeized them, ſent Brunehaut and her two daughters to Metz, and carried Meroveus to Soiſſons. Soon after, one of his generals being defeated by Gontran, who eſpouſed Brunehaut's cauſe, Chilperic, in a fit of rage, cauſed Meroveus to be ſhaved and confined in a monaſtery. From hence he found means to make his eſcape, and with great difficulty arrived in Auſtraſia, where Brunehaut would gladly have protected him: but the jealouſy of the nobles was ſo ſtrong, that he was forced to leave that country; and being betrayed into the hands of his father's forces, was murdered at the inſtigation of Fredegonde, as was generally believed.

The French empire was at this time divided between Gontran king of Orleans, called alſo king of Burgundy, Chilperic king of Soiſſons, and Childebert king of Auſtraſia. Chilperic found his affairs in a very diſagreeable ſituation. In 579, he had a diſpute with Varoc count of Bretagne, who refuſed to do him homage. Chilperic diſpatched a body of troops againſt him; who were defeated, and he was then forced to ſubmit to a diſhonourable peace. His brother and nephew lived in ſtrict union, and had no reaſon to be very well pleaſed with him. His own ſubjects, being oppreſſed with heavy taxes, were miſerably poor and diſcontented. His ſon Clovis, by a former queen named *Andovera*, hated Fredegonde, and made no ſecret of his averſion. To add to his embarraſſment, the ſeaſons were for a long time ſo unfavourable, that the country was threatened with famine and peſtilence at the ſame time. The king and queen were both attacked by an epidemic diſeaſe which then raged. They recovered: but their three ſons, Clodobert, Samſon, and Dagobert, died; after which, the ſight of Clovis became ſo diſagreeable to Fredegonde, that ſhe cauſed him to be murdered, and likewiſe his mother Andovera, left Chilperic's affection for her ſhould return after the tragical death of her ſon.

14 In 583 Chilperic himſelf was murdered by ſome un-
And likewiſe Chilperic. known aſſaſſins, when his dominions were on the point of being conquered by Gontran and Childebert, who had entered into a league for that purpoſe. After his death Fredegonde implored the protection of Gontran for herſelf and her infant ſon Clotaire; which he very readily granted, and obliged Childebert to put an end to the war. He found himſelf, however, greatly difficulted to keep Fredegonde and Brunehaut in awe; for theſe two princeſſes having been long rivals and implacable enemies, were continually plotting the deſtruction of each other. This, however, he accompliſhed, by favouring ſometimes Brunehaut and ſometimes Fredegonde; ſo that, during his life, neither of them durſt undertake any thing againſt the other. France.

15 On the 28th of March 593, died Gontran, having
Death of Gontran; lived upwards of 60, and reigned 32 years. Childebert ſucceeded to the kingdom without oppoſition, but did not long enjoy it; he himſelf dying in the year 596, and his queen ſhortly after. His dominions were divided between his two ſons Theodobert and Thierri; the firſt of whom was declared king of Auſtraſia, and the latter king of Burgundy. As Theodobert was only in the 11th year of his age, and Thierri in his 10th, Brunehaut governed both kingdoms with an abſolute ſway. Fredegonde, however, took care not to let ſlip ſuch a favourable opportunity as was offered her by the death of Childebert, and therefore made herſelf miſtreſs of Paris and ſome other places on the Seine.
16 Upon this Brunehaut ſent againſt her the beſt part of
And Fredegonde. the forces in Auſtraſia, who were totally defeated; but Fredegonde died before ſhe had time to improve her victory, leaving her ſon Clotaire heir to all her dominions.

For ſome time Brunehaut preſerved her kingdom in peace; but in the end her own ambition proved her ruin. Inſtead of inſtructing Theodobert in what was neceſſary for a prince to know, ſhe took care rather to keep him in ignorance, and even ſuffered him to marry a young and handſome ſlave of his father's. The new queen was poſſeſſed of a great deal of affability and good-nature; by which means ſhe in a ſhort time gained the affection of her huſband ſo much, that he readily
17 conſented to the baniſhment of Brunehaut. Upon this
Brunehaut baniſhed. diſgrace ſhe fled to Thierri king of Burgundy, in the year 599. By him ſhe was very kindly received; and inſtead of exciting jealouſies or miſunderſtandings between the two brothers, ſhe engaged Thierri to attempt the recovery of Paris and the other places which had been wreſted from their family by Fredegonde, procuring at the ſame time a conſiderable body of auxiliaries from the Viſigoths. This meaſure was ſo acceptable to Theodobert, that he likewiſe raiſed a numerous army, and invaded Clotaire's dominions in conjunction with his brother. A battle enſued, in which the forces of Clotaire were totally defeated, and himſelf obliged ſoon after to ſue for peace; which was not granted, but on condition of his yielding up the beſt part of his dominions.

This treaty was concluded in the year 600; but three years afterwards, it was broken by Clotaire. He was again attacked by the two brothers, and the war carried on with great vigour till the next ſpring. At this time Thierri having forced Landri, Clotaire's general, to a battle, gave him a total overthrow, in which the king's infant ſon Merovæus, whom he had ſent along with Landri, was maſſacred; to gratify, as Clotaire

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France. taire pretended, the malice of Brunehaut. After this victory, Thierri marched directly to Paris; fully bent on the deſtruction of his couſin, which now ſeemed inevitable. This, however, was prevented by Theodobert; who no ſooner heard of the victory gained by Thierri, than he became jealous of his ſucceſs, and offered Clotaire ſuch terms of peace as he gladly accepted. The latter having then nothing to fear on the ſide of Auſtraſia, quickly compelled Thierri to liſten to terms of accommodation alſo.

This behaviour of Theodobert greatly provoked his brother; and his reſentment was highly inflamed by Brunehaut, who never forgot her diſgrace in being baniſhed from his court. A war was therefore commenced between the two brothers in 605; but it was ſo highly diſapproved of by the nobility, that Thierri found himſelf obliged to put an end to it. The tranquillity which now took place was again diſturbed in 607, by Theodobert's ſending an embaſſy to demand ſome part of Childebert's dominions which had been added, by the will of that monarch, to thoſe of Burgundy. The nobility of both kingdoms were ſo much averſe to war, that they conſtrained their kings to conſent to a conference, attended by an equal number of troops; but Theodobert, by a ſcandalous breach of his faith, brought double the number, and compelled his brother to ſubmit to what terms he pleaſed. This piece of treachery inſtantly brought on a war; for Thierri was bent on revenge, and his nobility no longer oppoſed him. It was neceſſary, however, to ſecure Clotaire by a negociation; and accordingly a promiſe was made of reſtoring thoſe parts of his dominions which had formerly been taken from him, provided he would remain quiet. This treaty being finiſhed, Thierri entered Theodobert's dominions, defeated him in two battles, took him priſoner, uſed him with the utmoſt indignity; and having cauſed an infant ſon of his to be put to death, ſent him to his grandmother Brunehaut. By her orders he was firſt ſhaved and confined in a monaſtery; but afterwards, fearing leſt he ſhould make his eſcape, ſhe cauſed him to be put to death.—Clotaire, in the mean time, thought that the beſt method of making Thierri keep his word was to ſeize on thoſe places which he had promiſed to reſtore to him, before his return from the war with Theodobert. This he accordingly did; and Thierri no ſooner heard of his having done ſo, than he ſent him a meſſage requiring him to withdraw his forces, and, in caſe of his refuſal, declared war. Clotaire was prepared for this; and accordingly aſſembled all the forces in his dominions, in order to give him a proper reception. But before Thierri could reach his enemies, he was ſeized with a dyſentery; of which he died in the year 612, having lived 26 years, and reigned 17.

18 Death of Thierri.

On the death of Thierri, Brunehaut immediately cauſed his eldeſt ſon, named *Sigiſbert*, then in the 10th year of his age, to be proclaimed king. It is probable that ſhe intended to have governed in his name with an abſolute ſway; but Clotaire did not give her time to diſcover her intentions. Having great intelligence in Auſtraſia and Burgundy, and knowing that the nobility in both kingdoms were diſaffected to Brunehaut, he declared war againſt her; and ſhe being betrayed by her generals, fell into the hands of her enemies. Clotaire gave her up to the nobles; who generally hated her, and who uſed her in the moſt cruel manner. After having led her about the camp, expoſed to the inſults of all who had the meanneſs to inſult her, ſhe was tied by the leg and arm to the tail of an untamed horſe, which, ſetting off at full ſpeed, quickly daſhed out her brains. After this her mangled body was reduced to aſhes, which were afterwards interred in the abbey of St Martin at Autun. France. 19 Is put to a cruel death.

Thus in the year 613, Clotaire became ſole monarch of France; and quietly enjoyed his kingdom till his death, which happened in 628. He was ſucceeded by Dagobert; who proved a great and powerful prince, and raiſed the kingdom of France to a high degree of ſplendor. Dagobert was ſucceeded by his ſons Sigebert and Clovis; the former of whom had the kingdom of Auſtraſia, and the latter that of Burgundy. Both the kings were minors at the time of their acceſſion to the throne, which gave an opportunity to the mayors of the palace (the higheſt officers under the crown) to uſurp the whole authority. Sigebert died in 640, after a ſhort reign of one year; leaving behind him an infant ſon named *Dagobert*, whom he ſtrongly recommended to the care of Grimoalde his mayor of the palace. The miniſter cauſed Dagobert to be immediately proclaimed king, but did not long ſuffer him to enjoy that honour. He had not the cruelty, however, to put him to death; but ſent him to a monaſtery in one of the Weſtern iſlands of Scotland; and then, giving out that he was dead, advanced his own ſon Childebert to the throne. Childebert was expelled by Clovis king of Burgundy; who placed on the throne Childeric, the ſecond ſon of Sigebert. Clovis died ſoon after the revolution, and was ſucceeded in his dominions by his ſon Clotaire; who died in a ſhort time, without iſſue. He was ſucceeded by his brother Childeric; who, after a ſhort reign, was murdered with his queen, at that time big with child, and an infant ſon named *Dagobert*; though another, named *Daniel*, had the good luck to eſcape.

20 Miſerable ſituation of France.

The affairs of the French were now in the moſt deplorable ſituation. The princes of the Merovingian race had been for ſome time entirely deprived of their power by their officers called *mayors of the palace*. In Auſtraſia the adminiſtration had been totally engroſſed by Pepin and his ſon Grimoalde; while Archambaud and Ebroin did the ſame in Neuſtria and Burgundy. On the reunion of Neuſtria and Burgundy to the reſt of the French dominions, this miniſter ruled with ſuch a deſpotic ſway, that the nobility of Auſtraſia were provoked to a revolt; electing for their dukes two chiefs named *Martin* and *Pepin*. The forces of the confederates, however, were defeated by Ebroin; and Martin having ſurrendered on a promiſe of ſafety, was treacherouſly put to death. Pepin loſt no time in reeruiting his ſhattered forces; but before he had any occaſion to try his fortune a ſecond time in the field of battle, the aſſaſſination of Ebroin delivered him from all apprehenſions from that quarter. After his death Pepin carried every thing before him, overthrew the royal army under the command of the new miniſter Bertaire; and, having got poſſeſſion of the capital, cauſed himſelf to be declared mayor of the palace; in which ſtation he continued to govern with an abſolute ſway during the remainder of his life.

Pepin (who had got the ſurname of *Heriſtal* from his

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France. his palace on the Meuſe) died in the year 714, having enjoyed unlimited power for 26 years. He appointed his grandſon Theudobalde, then only ſix years of age, to ſucceed him in his poſt of mayor of the palace. This happened during the reign of Dagobert already mentioned; but this prince had too much ſpirit to ſuffer himſelf to be deprived of his authority by an infant. The adherents of the young mayor were defeated in battle, and this defeat was ſoon followed by his death.

21 Exploits of Charles Martel. Charles, however, the illegitimate ſon of Pepin, was now raiſed to the dignity of duke by the Auſtraſians, and by his great qualities ſeemed every way worthy of that honour. The murder of Dagobert freed him from a powerful opponent; and the young king Chilperic, who after Dagobert's death was brought from a cloyſter to the throne, could by no means cope with ſuch an experienced antagoniſt. On the 19th of March 717, Charles had the good fortune to ſurpriſe the royal camp as he paſſed through the foreſt of Arden; and ſoon after a battle enſued, in which the king's forces were entirely defeated. On this Chilperic entered into an alliance with Eudes duke of Aquitaine, whoſe friendſhip he purchaſed by the final ceſſion of all the country which Eudes had ſeized for himſelf. Charles, however, having placed on the throne another of the royal family named *Clotaire*, advanced againſt Chilperic and his aſſociate, whom he entirely defeated near Soiſſons. After this diſaſter, Eudes, deſpairing of ſucceſs, delivered up Chilperic into the hands of his antagoniſt; after having ſtipulated for himſelf the ſame terms which had been formerly granted him by the captive monarch.

Charles now advanced to the ſummit of power, treated Chilperic with great reſpect; and, on the death of Clotaire, cauſed him to be proclaimed king of Auſtraſia; by which, however, his own power was not in the leaſt diminiſhed: and from this time the authority of the kings of France became merely nominal; and ſo inactive and indolent were they accounted, that hiſtorians have beſtowed upon them the epithet of *faineans*, i. e. "lazy or idle." Charles, however, had ſtill one competitor to contend with. This was Rainfroy, who had been appointed mayor of the palace; and who made ſuch a vigorous reſiſtance, that Charles was obliged to allow him the peaceable poſſeſſion of the country of Anjou. No ſooner, however, had Charles thus ſet himſelf at liberty from domeſtic enemies, than he was threatened with deſtruction from foreign nations. The Suevians, Friſons, and Alemanni, were ſucceſſively encountered and defeated. Eudes alſo, who had perfidiouſly broken the treaties to which he had bound himſelf, was twice repulſed; after which Charles invaded Aquitain, and obliged the treacherous duke to hearken to reaſon. This was ſcarce accompliſhed, when he found himſelf engaged with a more formidable enemy than any he had yet encountered. The Saracens, having over-run great part of Aſia, now turned their victorious arms weſtward, and threatened Europe with total ſubjection. Spain had already received the yoke; and having paſſed the Pyrenees, they next invaded France, appearing in vaſt numbers under the walls of Thouloufe. Here they were encountered and defeated by Eudes; but this proved only a partial check. The barbarians once more paſſing the Pyrenees, entered France with ſuch a powerful army, that Eudes was no longer able to reſiſt. He encountered them indeed with his accuſtomed valour; but being forced to yield to ſuperior power, he ſolicited the protection and aſſiſtance of Charles. On this occaſion the latter, on account of his valour and perſonal ſtrength, acquired the name of *Martel*, i. e. "the hammer," alluding to the violence of the ſtrokes he beſtowed on his enemies*. Three hundred and ſeventy-five thouſand of the Infidels, among whom was the commander Abderahman himſelf, are ſaid to have periſhed in the battle; notwithſtanding which they ſoon made another irruption: but in this they were attended with no better ſucceſs, being again defeated by Charles; who by ſo many victories eſtabliſhed his power on the moſt ſolid foundation. Having again defeated the Friſons, and with his own hand killed their duke, he aſſumed the ſovereignty of the dominions of Eudes after his deceaſe, reſerving to himſelf the claim of homage, which he ought to have yielded to Thierri his lawful ſovereign. At laſt his fame grew ſo great, that he was choſen by pope Gregory III. for his protector. He offered to ſhake off the yoke of the Greek emperor, and to inveſt Charles with the dignity of Roman conſul; ſending him at the ſame time the keys of the tomb of St Peter; but while this negociation was going on ſucceſsfully, the pope, the emperor, and Charles Martel himſelf died. After his death, which happened in the year 741, his dominions were divided among his three ſons, Carloman, Pepin, and Grippon, according to the diſpoſition he had made in his life-time. By this Carloman, the eldeſt, had Auſtraſia; Pepin, the ſecond, Neuſtria and Burgundy; while Grippon, the third, had only ſome lands aſſigned him in France; by which he was ſo much diſpleaſed, that the tranquillity of the empire was ſoon diſturbed. With the aſſiſtance of his mother Sonnechilde he ſeized on the city of Laon, where he endured a violent ſiege. In the end, however, he was obliged to ſubmit; Sonnechilde was put into a monaſtery, and Grippon impriſoned in a caſtle at Arden. The two brothers, having thus freed themſelves from their domeſtic enemy, continued to govern the empire with uninterrupted harmony; but their tranquillity was ſoon diſturbed by the intrigues of Sonnechilde. That enterpriſing and ambitious woman had negociated a marriage between Odilon duke of Bavaria and Hiltrude the ſiſter of the two princes. This was no ſooner accompliſhed than Odilon, inſtigated by Sonnechilde, and alarmed at the growing power of the two princes, entered into an alliance with Theodobald duke of the Alemanni and Theodoric duke of the Saxons; who having aſſembled a formidable army, advanced directly againſt the princes. They poſted themſelves in an advantageous manner, with the river Lech in their front; but Carloman and Pepin, paſſing the river at different fords in the night-time, attacked the camp of the allies with great vigour. The engagement continued doubtful for five hours; but at laſt the entrenchments were forced on all ſides, the Bavarians and Saxons entirely routed, and the vanquiſhed dukes obliged to ſubmit to the clemency of the victors. During their abſence on this expedition, Hunalde, whom Charles Martel had appointed duke of Aquitain, having likewiſe entered into a confederacy with Odilon, paſſed the Loire, ravaged the open country, and burnt the magnificent cathedral of the city of Chartres. The two princes, however, having returned with their victorious

France. * See *Arabia*, n° 174.

22 France divided among the ſons of Charles.

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France. torious army, Hunalde found himſelf obliged to retreat: and even this availed him but little; for the Franks entering the duchy of Aquitain, committed ſuch devaſtations, that Hunalde in deſpair reſigned his dominions to his ſon, and retired into a convent. This event was ſoon followed by a ſimilar reſignation of Carloman, notwithſtanding the uninterrupted ſucceſs he had met with. He ſuddenly took the reſolution of retiring into a convent, and perſiſted in his deſign, notwithſtanding the intreaties of Pepin, who, to appearance at leaſt, did all he could to diſſuade him.

23 Pepin becomes ſole maſter of the kingdom.

By the reſignation of Carloman, which happened in the year 746, Pepin was left ſole maſter of France; and in this exalted ſtation he acquitted himſelf in ſuch a manner as has juſtly rendered his name famous to poſterity. One of the firſt acts of his new adminiſtration was to releaſe his brother Grippon from priſon: but that treacherous prince had no ſooner regained his liberty, than he again excited the Saxons to take up arms. His enterpriſe, however, proved unſucceſsful; the Saxons were defeated, their duke Theodoric taken, and his ſubjects obliged to ſubmit to the will of the conqueror; who upon this occaſion cauſed them make a profeſſion of the Chriſtian religion. Grippon then fled to Hiltrude, his half-ſiſter, whoſe huſband Odilon was now dead, and had left an infant ſon named *Taſſilon*. He met with a favourable reception from her; but, with his uſual treachery, ſeized both her and her ſon by the aſſiſtance of an army of malcontent Franks, whom he had perſuaded to join him. His next ſtep was to aſſume the ſovereignty and title of duke of Bavaria; but being driven from the throne by Pepin, he was obliged to implore his clemency, which was once more granted. All theſe misfortunes, however, were not yet ſufficient to cure Grippon of his turbulence and ambition: He once more endeavoured to excite diſturbances in the court of Pepin; but being finally detected and baffled, he was obliged to take refuge in Aquitain.

24 Aſſumes the title of king.

Pepin having now ſubdued all his foes both foreign and domeſtic, began to think of aſſuming the title of *king*, after having ſo long enjoyed the regal power. His wiſhes in this reſpect were quite agreeable to thoſe of the nation in general. The nobility, however, were bound by an oath of allegiance to Childeric the nominal monarch at that time; and this oath could not be diſpenſed with but by the authority of the pope. Ambaſſadors for this purpoſe were therefore diſpatched both from Pepin and the nobility to pope Zachary, the reigning pontiff. His holineſs replied, that it was lawful to transfer the regal dignity from hands incapable of maintaining it to thoſe who had ſo ſucceſsfully preſerved it; and that the nation might unite in the ſame perſon the authority and title of *king*. On this the unfortunate Childeric was degraded from his dignity, ſhaved, and confined in a monaſtery for life; Pepin aſſumed the title of *king of France*, and the line of Clovis was finally ſet aſide.

This revolution took place in the year 751. The attention of the new monarch was firſt claimed by a revolt of the Saxons; but they were ſoon reduced to ſubjection, and obliged to pay an additional tribute: and during his expedition againſt them, the king had the ſatisfaction of getting rid of his reſtleſs and treacherous competitor Grippon. This turbulent prince, having ſoon become weary of reſiding at the court of Aquitain, determined to eſcape from thence, and put himſelf under the protection of Aſtolphus king of the Lombards; but he was killed in attempting to force a paſs on the confines of Italy. Pepin in the mean time continued to puſh his good fortune. The ſubmiſſion of the Saxons was ſoon followed by the reduction of Brittany; and that by the recovery of Narbonne from the Infidels. His next exploit was the protection of pope Stephen III. againſt Aſtolphus the king of the Lombards, who had ſeized on the exarchate of Ravenna, and inſiſted on being acknowledged king of Rome. The pope, unable to contend with ſuch a powerful rival, haſted to croſs the Alps and implore the protection of Pepin, who received him with all the reſpect due to his character. He was lodged in the abbey of St Dennis, and attended by the king in perſon during a dangerous ſickneſs with which he was ſeized. On his recovery Stephen ſolemnly placed the diadem on the head of his benefactor, beſtowed the regal unction on his ſons Charles and Carloman, and conferred on the three princes the title of *patrician of Rome*. In return for theſe honours Pepin accompanied the pontiff into Italy at the head of a powerful army. Aſtolphus, unable to withſtand ſuch a powerful antagoniſt, ſhut himſelf up in Pavia, where he was cloſely beſieged by the Franks, and obliged to renounce all pretenſions to the ſovereignty of Rome, as well as to reſtore the city and exarchate of Ravenna, and ſwear to the obſervance of the treaty. No ſooner was Pepin gone, however, than Aſtolphus broke the treaty he had juſt ratified with ſuch ſolemnity. The pope was again reduced to diſtreſs, and again applied to Pepin. He now ſent him a pompous epiſtle in the ſtyle and character of St Peter himſelf; which ſo much inflamed the zeal of Pepin, that he inſtantly ſet out for Italy, and compelled Aſtolphus a ſecond time to ſubmit to his terms, which were now rendered more ſevere by the impoſition of an annual tribute. Pepin next made a tour to Rome; but finding that his preſence there gave great uneaſineſs both to the Greeks and to the pope himſelf, he thought proper to finiſh his viſit in a ſhort time. Soon after his return Aſtolphus died, and his dominions were uſurped by his general Didier; who, however, obtained the papal ſanction for what he had done, and was recogniſed as lawful ſovereign of the Lombards in the year 756.

Pepin returned to France in triumph; but the peace of his dominions was ſoon diſturbed by the revolt of the Saxons, who always bore the French yoke with the utmoſt impatience. Their preſent attempts, however, proved equally unſucceſsful with thoſe they had formerly made; being obliged to ſubmit and purchaſe their pardon not only by a renewal of their tribute, but by an additional ſupply of 300 horſe. But while the king was abſent on this expedition, Vaifar duke of Aquitain took the opportunity of ravaging Burgundy, where he carried his devaſtations as far as Chalons. Pepin ſoon returned, and entering the dominions of Vaifar, committed ſimilar devaſtations, and would probably have reduced the whole territory of Aquitain, had he not been interrupted by the hoſtile preparations of his nephew Taſſilon the duke of Bavaria. The king, however, contented himſelf at preſent with ſecuring his frontiers by a chain of poſts, againſt any

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France. invaſion; after which he reſumed his enterpriſe on the dominions of Vaiſar. The latter at firſt attempted to impede the progreſs of his antagoniſt by burning and laying waſte the country; but finding this to no purpoſe, he determined to try his fortune in an engagement. Victory declared in favour of Pepin; but he refuſed to grant a peace upon any terms. The French monarch advanced to the banks of the Garonne; while Vaiſar was abandoned by his ally the duke of Bavaria, and even by his own ſubjects. In this diſtreſs he retired with a band of faithful followers into the country of Saintonge, where he defended himſelf as long as poſſible, but was at laſt deprived both of his crown and life by the victor.

Thus the duchy of Aquitain was once more annexed to the crown of France; but Pepin had ſcarce time to indulge himſelf with a view of his new conqueſt when he was ſeized with a ſlow fever, which put an
25 Death of Pepin. end to his life in the year 768, the 54th of his age, and 17th of his reign. He was of a ſhort ſtature, whence he had the ſurname of *Le Bref*, or *the Short*; but his great actions juſtly intitled him to the character of an hero; though under the ſucceeding reign his own fame ſeemed to have been entirely forgot, and on his tomb was only inſcribed, "Here lies the father of Charlemagne."

26 Succeeded by his two ſons. Pepin was ſucceeded in his authority by his two ſons Charles and Carloman; to whom with his dying breath he bequeathed his dominions. They continued to reign jointly for ſome time; but the active and enterpriſing ſpirit of Charles gave ſuch umbrage to the weak and jealous Carloman, that he regarded him with envy, and was on the point of coming to an open rupture with him, when he himſelf was taken off by death, and thus the tranquillity of the empire was preſerved.

The firſt military enterpriſe of Charles was againſt Hunalde, the old duke of Aquitain; who leaving the monaſtery where he had reſided upwards of 20 years, aſſumed the royal title, and was joyfully received by his ſubjects, already weary of the French yoke. Charles took the field with the utmoſt expedition, and with difficulty prevailed upon his brother Carloman, who was then alive, to join him with his forces. But the junction was ſcarce effected, when Carloman withdrew his forces again, and left his brother to carry on the war in the beſt manner he could. Charles, though thus deſerted, did not heſitate at engaging the enemy; and having overthrown them in a great battle, Hunalde was obliged to fly to the territories of Lupus duke of Gaſcony. Charles quickly ſent an embaſſy demanding the fugitive prince; and Lupus, not daring to diſobey the orders of ſuch a powerful monarch, yielded up the unfortunate Hunalde, who was inſtantly caſt into priſon, from which, however, he afterwards made his eſcape.

27 Reign of Charles the Great. The death of Carloman, which happened in the year 771, left Charles ſole maſter of France; but the revolt of the Saxons involved him in a ſeries of wars from which he did not extricate himſelf for 33 years. Theſe had long been tributaries to the French, but frequently revolted; and now, when freed from the terror of Pepin's arms, thought they had a right to ſhake off the yoke altogether. Charles entered their country with a powerful army; and having defeated them in a number of ſmall engagements, advanced towards Ereſbourg near Paderborn, where they had their capital poſt, and where was the image of their god Irminſul, repreſented as a man completely armed, and ſtanding on a column. The Saxons made an obſtinate defence, but were at laſt obliged to ſubmit; and Charles employed his army three days in demoliſhing the monuments of idolatry in this place; which ſo much diſheartened the whole nation, that for the preſent they ſubmitted to ſuch terms as he pleaſed to impoſe; and which were rendered eaſier than they probably would have been, by the news which Charles now received from Italy. He had concluded a marriage with the daughter of Didier king of the Lombards; but this had been diſſolved by the Pope, who reproached the Lombards with the firſt ſtain of the leproſy. Thus all friendſhip was diſſolved betwixt Didier and Charles; and as the Lombard monarchs ſeem to have had a kind of natural enmity towards the popes, it is not ſurpriſing that it ſhould now break out with uncommon fury. Didier having ſeized and frighted to death Pope Stephen IV. uſed his utmoſt endeavours to reduce his ſucceſſor Adrian I. to a ſtate of entire dependance on himſelf. Adrian applied to the French monarch, the uſual reſource of the pontiffs in thoſe days. Charles was very willing to grant the neceſſary aſſiſtance, but the nobility were averſe to an Italian war; ſo that he was obliged to act with great circumſpection. Several embaſſies were therefore ſent to Didier, entreating him to reſtore to the pope thoſe places which he had taken from him, and at laſt even offering him a large ſum of money if he would do ſo; but this propoſal being rejected, he obtained the conſent of his nobility to make war on the Lombards. Didier diſpoſed his troops in ſuch a manner, that the officers of Charles are ſaid to have been unanimouſly of opinion that it would be impoſſible to force a paſſage. This, however, was accompliſhed, either through the ſuperior ſkill of Charles, according to ſome hiſtorians, or a panic which ſeized the Lombard ſoldiers, according to others; after which, Didier, with the old duke of Aquitain, who had eſcaped from his priſon, and taken refuge at his court, ſhut themſelves up in Pavia. Adalgiſe, the only ſon of the Lombard monarch, with the widow and children of Carloman, fled to Verona. That city was immediately inveſted by the conqueror, and in a ſhort time obliged to ſubmit. Adalgiſe had the good luck to eſcape to Conſtantinople, but we are not informed what became of Carloman's widow and children. Charles, after paying a ſhort viſit to Rome, returned to the ſiege of Pavia. The place was vigorouſly defended, until famine and peſtilence obliged the inhabitants to implore the clemency of Charles. Hunalde fell a ſacrifice to his own obſtinacy in oppoſing the intention of the people; Didier was taken priſoner and carried into France; but we are not informed of his fate afterwards. His kingdom, however, was totally diſſolved, and Charles was crowned king of Lombardy at Milan in the year 774.

France. Having received the oaths of allegiance from his new ſubjects, Charles ſet out for Saxony, the inhabitants of which had again revolted, and recovered Ereſbourg their capital. The king ſoon recovered this important poſt; but a detachment of his army being cut off, and new troubles ariſing in Italy, he was obli-

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France

ged to accept of the propoſals of the Saxons, though their ſincerity was very doubtful. Having therefore only ſtrengthened the fortifications of Ereſbourg, and left a ſufficient garriſon in the place, he ſet out for Italy, which was all in commotion through the intrigues of the emperor of the Eaſt, and Adalgiſe the ſon of Didier. The preſence of Charles reſtored tranquillity in that quarter; but in the mean time, the Saxons having taken Ereſbourg and deſtroyed the fortifications, threatened to annihilate the French power in that quarter. On the king's return, he found them employed in the ſiege of Sigebourg. His ſudden arrival ſtruck the barbarians with ſuch terror, that they inſtantly ſued for peace; which the king once more granted, but took care to ſecure their obedience by a chain of forts along the river Lippe, and repairing the fortifications of Ereſbourg. An aſſembly of the Saxon chiefs was held at Paderborn; and a promiſe was made, that the nation ſhould embrace the Chriſtian religion: after which the king ſet out on an expedition to Spain in the year 778.

This new enterpriſe was undertaken at the requeſt of Ibunala, the Mooriſh ſovereign of Saragoſſa, who had been driven from his territory. He was reſtored, however, by the proweſs of Charles, who reduced the cities of Pampluna and Saragoſſa. He reduced alſo the city of Barcelona, and the kingdoms of Navarre and Arragon; but on his return, he met with a ſevere check from the Gaſcons, who attacked and defeated the rear-guard of his army with great ſlaughter as they paſſed the Pyrenean mountains. This engagement, which ſeems to imply ſome defect in the prudence or military ſkill of Charles, has been much celebrated among romance writers, on account of the death of Roland a famous warrior.

Next year, 779, he paid a viſit to Italy with his two ſons Carloman and Louis. Having paſſed the winter at Pavia, he entered Rome next ſpring amidſt the acclamations of the inhabitants. Here, in the 39th year of his age, he divided his dominions in preſence of the pope betwixt his two ſons Carloman and Louis. The former, who now took the name of Pepin, had Lombardy; the latter Aquitain. Having then received the ſubmiſſion of Taſſilon duke of Bavaria, he ſet out for Saxony, where he took a moſt ſeveye revenge on the people of that country for the many treacheries they had been guilty of. The preſent revolt was chiefly owing to a chief named Witikind, who had twice before fled from the victorious arms of Charles, and taken refuge at the court of Denmark. Returning from thence in the king's abſence, he rouſed his countrymen to action, while the generals of Charles, diſagreeing among themſelves, neglected to take the proper methods for repelling the enemy. In conſequence of this, they were entirely defeated on the banks of the Weſer in the year 782. Charles arrived in time to prevent the total deſtruction of his people, and directly penetrated into the heart of the country. Witikind, unable to reſiſt his antagoniſt, once more fled into Denmark; but 4500 of his followers periſhed at once by the hands of the executioner. An univerſal inſurrection was the conſequence of this unheard-of cruelty; and though during three years the French monarch was conſtantly ſucceſsful in the field, he found it impoſſible by any force whatever to ſubdue the ſpirit of the people. At laſt therefore he was obliged to have recourſe to negociation. Witikind and ſeveral other chiefs were invited to an interview; where Charles repreſented to them in ſuch ſtrong colours the ruin which muſt neceſſarily enſue to their country by perſiſting obſtinately in oppoſition to him, that they were induced not only to perſuade their countrymen finally to ſubmit, but to embrace the Chriſtian religion. France

Charles having thus brought his affairs in Saxony to an happy concluſion, turned his arms againſt Taſſilon duke of Bavaria, who had underhand ſupported the Saxons in their revolt. Having entered his country with a powerful army in the year 787, he made ſuch rapid advances, that the total deſtruction of Taſſilon ſeemed inevitable. Charles had advanced as far as the river Lech, when Taſſilon privately entered his camp, and threw himſelf at his feet. The king had compaſſion on his faithleſs kinſman on ſeeing him in this abject poſture; but no ſooner did the traitor find himſelf at liberty, than he ſtirred up the Hunns, the Greek emperor, and the fugitive Adalgiſe, againſt the king. He fomented alſo the diſcontents of the factious nobles of Aquitain and Lombardy; but his ſubjects, fearing leaſt theſe intrigues ſhould involve them in deſtruction, made a diſcovery of the whole to Charles. Taſſilon, ignorant of this, entered the diet at Ingelheim, not ſuſpecting any danger, but was inſtantly arreſted by order of the French monarch. Being brought to a trial, the proofs of his guilt were ſo apparent, that he was condemned to loſe his head: the puniſhment, however, was afterwards mitigated to perpetual confinement in a monaſtery, and the duchy of Bavaria was annexed to the dominions of Charles.

The Hunns and other enemies of the French monarch continued to proſecute their enterpriſes without regarding the fate of their aſſociate Taſſilon. Their attempts, however, only ſerved to enhance the fame of Charles. He defeated the Hunns in Bavaria, and the Greek emperor in Italy; obliging the latter to renounce for ever the fortune of Adalgiſe. The Hunns, not diſheartened by their defeat, continuing to infeſt the French dominions, Charles entered their country at the head of a formidable army; and having forced their entrenchments, penetrated as far as Raa on the Danube, but was compelled by an epidemic diſtemper to retire before he had finiſhed his conqueſt. He was no ſooner returned to his own dominions, than he had the mortification to be informed, that his eldeſt ſon Pepin had conſpired againſt his ſovereignty and life. The plot was diſcovered by a prieſt who had accidentally fallen aſleep in a church where the conſpirators were aſſembled. Being awakened by their voices, he overheard them conſulting on the proper meaſures for completing their purpoſe; on which he inſtantly ſet out for the palace, and ſummoned the monarch from his bed to inform him of the guilt of his ſon. Pepin was ſeized, but had his life ſpared, tho' condemned to expiate his offences by ſpending the remainder of his days in a monaſtery.

Charles was no ſooner freed from this danger than he was again called to arms by a revolt of the Saxons on the one hand, while a formidable invaſion of the Moors diſtreſſed him on the other; the Hunns at the ſame time renewing their depredations on his dominions.

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France. nions. The king did not at preſent make war againſt the Moors; probably foreſeeing that they would be called off by their Chriſtian enemies in Spain. This accordingly happened; the victories of Alonſo the Chaſte obliged them to leave France; after which Charles marched in perſon to attack the Saxons and Hunns. The former conſented again to receive the Chriſtian religion, but were likewiſe obliged to deliver up a third part of their army to be diſpoſed of at the king's pleaſure; but the Hunns defended themſelves with incredible vigour. Though often defeated, their love of liberty was altogether invincible; ſo that the war was not terminated but by the death of the king, and an almoſt total deſtruction of the people: only one tribe could be induced to acknowledge the authority of the French monarch.

Theſe exploits were finiſhed betwixt the years 793 and 798; after which Charles invaded and ſubdued the iſland of Majorca and Minorca; which the diſſenſions of the Mooriſh chiefs gave him an opportunity of doing. The ſatisfaction he felt from this new conqueſt, however, was ſoon damped by the troubles which broke out in Italy. After the death of pope Adrian, his nephew aſpired to the papal dignity; but a prieſt named Leo being preferred, the diſappointed candidate determined on revenge. He managed matters ſo well, that his deſigns were concealed for four years. At laſt, on the day of a proceſſion, a furious aſſault was made on the perſon of Leo. The unfortunate pontiff was left for dead on the ground; but having with difficulty recovered, and made his eſcape to the Vatican, he was protected by the duke of Spoleto, at that time general of the French forces. His cauſe was warmly eſpouſed by Charles, who invited him to his camp at Paderborn in Weſtphalia; whence he diſpatched him with a numerous guard to Rome, promiſing ſoon after to viſit that metropolis, and redreſs all grievances. His attention for the preſent, however, was called by the deſcents of the Normans on the maritime provinces of his dominions; ſo that he was obliged to defer the promiſed aſſiſtance for ſome time longer. Having conſtructed forts at the mouths of moſt of the navigable rivers, and further provided for the defence of his territories, by inſtituting a regular militia, and appointing proper ſquadrons to cruiſe againſt the invaders, he ſet out for the fourth and laſt time on a journey to Rome. Here he was received with the higheſt poſſible honours. Leo was allowed to clear himſelf by oath of the crimes laid to his charge by his enemies, while his accuſers were ſent into exile. On the feſtival of Chriſtmas, in the year 800, after Charles had made his appearance in the cathedral of St Peter, and aſſiſted devoutly at maſs, the pope ſuddenly put a crown on his head; and the place inſtantly reſounded with acclamations of "Long life to Charles the Auguſt, crowned by the hand of GOD! Long life and victory to the great and pacific emperor of the Romans!" His body was then conſecrated and anointed with royal unction; and after being conducted to a throne, he was treated with all the reſpect uſually paid to the ancient Cæſars; from this time alſo being honoured with the title of *Charlemagne*, or *Charles the Great*. In private converſation, however, he uſually proteſted, that he was ignorant of the pope's intention at this time; and that, had he known it, he would have

28 He is crowned emperor of the weſt.

diſappointed him by his abſence: but theſe proteſtations were not generally believed; and the care he took to have his new title acknowledged by the eaſtern emperors, evidently ſhowed how fond he was of it. France.

Charles, now raiſed to the ſupreme dignity in the weſt, propoſed to unite in himſelf the whole power of the firſt Roman emperors, by marrying Irene the empreſs of the eaſt. But in this he was diſappointed by the marriage of that princeſs by Nicephorus; however, the latter acknowledged his new dignity of Auguſtus, and the boundaries of the two empires were amicably ſettled. Charles was further gratified by the reſpect paid him by the great Haroun Al-Raſhid, caliph of the Saracens, who yielded to him the ſacred city of Jeruſalem, and holy ſepulchre there. But in the mean time his empire was threatened with the invaſion of a very formidable enemy, whom even the power of Charles would have found it hard to reſiſt. Theſe were the Normans, at this time under the government of Godfrey a celebrated warrior, and who by their adventurous ſpirit, and ſkill in maritime affairs, threatened all the weſtern coaſts of Europe with deſolation. From motives of mutual convenience a tranſitory peace was eſtabliſhed, and Charles made uſe of this interval to ſettle the final diſtribution of his dominions. Aquitain and Gaſcony, with the Spaniſh march, were aſſigned to his ſon Louis; Pepin had Italy confirmed to him; and to this was added the greateſt part of Bavaria, with the country now poſſeſſed by the Griſons. Charles the eldeſt had Neuſtria, Auſtraſia, and Thuringia. The donation was ſuppoſed to be rendered more authentic by the ſanction of the pope. This diviſion, however, had ſcarce taken place, when the princes were all obliged to defend their dominions by force of arms. Louis and Pepin were attacked by the Saracens, and Charles by the Sclavonians. All theſe enemies were defeated; but while Charles hoped to ſpend the ſhort remainder of his life in tranquillity, he was once more called forth to martial exertions by the hoſtile behaviour of Godfrey the Norman leader. Charles ſent him a meſſage of defiance, which was returned in the ſame ſtyle by Godfrey: but the former, by artfully fomenting diviſions among the northern powers, prevented for a while the threatened danger; but, theſe diſturbances being quelled, the Normans renewed their depredations, and Charles was obliged to face them in the field. An engagement, however, was prevented by the death of Godfrey, who was aſſaſſinated by a private ſoldier; on which the Norman army retreated, and the dominions of the emperor ſtill remained free from theſe invaders. Still the latter days of Charles were embittered by domeſtic misfortunes. His favourite daughter Rotrude died, as did alſo Pepin king of Italy; and theſe misfortunes were ſoon followed by the death of his eldeſt ſon Charles. The emperor then thought proper to aſſociate his only ſurviving ſon Louis with him in the government; which was formally done at Aix-la-Chapelle. Charles himſelf ſurvived this tranſaction only a few months: his death happened on the 27th of January 814; in the 71ſt year of his age, and 47th of his reign.

29 Death of Charles the Great.

By the martial atchievements of this hero, the French monarchy was raiſed to its utmoſt pitch of ſplendor. He had added the province of Aquitain to the territories of his anceſtors; he had confined the inhabitants

30 Extent of his territories.

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